(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 234 045**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: 86118020.6

(22) Date of filing: 23.12.86

(51) Int.Cl.³: C 07 D 231/20
C 07 D 231/18, C 07 D 405/14- 2
C 07 D 409/12, C 07 D 413/1- 2
C 07 D 401/12, C 07 D 231/2- 2

(30) Priority: 27.12.85 JP 295759/85
27.12.85 JP 295760/85
08.02.86 JP 26582/86
27.06.86 JP 151187/86
28.07.86 JP 177447/86
02.09.86 JP 206442/86
03.09.86 JP 206993/86

(43) Date of publication of application:
02.09.87 Bulletin 87/36

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL SE

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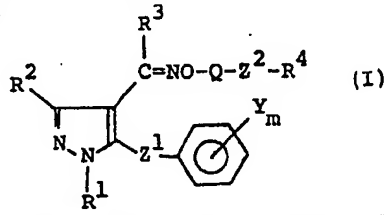
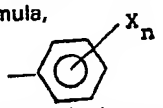
(54) A pyrazole oxime derivative and its production and use.

(57) A pyrazole oxime derivative represented by the general formula (I) which is useful as an insecticide, mitecide and fungicide,

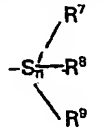


(I)

wherein R^1 represents C_1-C_4 alkyl or phenyl; R^2 represents hydrogen, C_1-C_5 alkyl, C_1-C_3 haloalkyl or phenyl; R^3 represents hydrogen, C_1-C_4 alkyl or phenyl; R^4 represents hydrogen, C_2-C_4 alkylcarbonyl, benzoyl, naphthyl or a substituent of the formula,



[in which X represents hydrogen; halogen; C_1-C_{12} alkyl; C_1-C_6 alkyl substituted with halogen, cyano, hydroxy, C_1-C_5 alkoxy or C_2-C_6 alkoxycarbonyl; C_3-C_8 cycloalkyl; cycloalkyl substituted with from one to three members selected from the group consisting of C_1-C_4 alkyl, halogen and cyano; C_2-C_4 alkenyl substituted with halogen, hydroxy, C_2-C_4 alkoxycarbonyl or C_2-C_6 alkylcarbonyl; phenyl; hydroxy; C_1-C_6 alkoxy; C_1-C_4 alkoxy substituted with halogen or C_2-C_6 alkoxycarbonyl; phenoxy which may or may not be substituted with C_1-C_3 haloalkyl benzyloxy; C_1-C_3 alkylenedioxy formed by two adjacent Xs; pyridyloxy which may or may not be substituted with halogen or C_1-C_3 haloalkyl; a substituent of the formula, $-S(O)_pR^5$ (in which R^5 represents C_1-C_6 alkyl, C_1-C_5 haloalkyl or phenyl, and p represents an integer of 0, 1 or 2); cyano; formyl; nitro; a substituent of the formula $-COOR^6$ (in which R^6 represents hydrogen; alkali metal; C_1-C_{16} alkyl; C_1-C_6 alkyl substituted with halogen, C_1-C_4 alkoxy, phenoxy, C_2-C_4 alkoxycarbonyl or phenoxyphenyl; C_2-C_7 alkenyl; C_3-C_7 alkynyl; C_3-C_8 cycloalkyl; C_3-C_8 cycloalkyl substituted with C_1-C_3 alkyl; phenyl; or a substituent of the formula,



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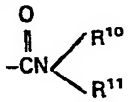
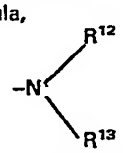
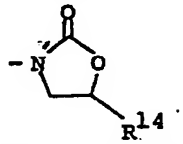
(in which R^7, R^8 and R^9, which may be the same or different, represent C_1-C_4 alkyl or C_3-C_8 cycloalkyl)}; C_2-C_6 alkylcarbonyl; C_2-C_6 alkylcarbonyl substituted with cyano or C_2-C_6 alkoxycarbonyl; benzoyl which may or may not be substituted with halogen or C_1-C_6 alkyl; C_2-C_6 alkylthiocarbonyl; C_3-C_7 alkoxycarbonylcarbonyl; a substituent of the formula,



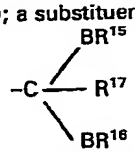
(in which R^{10} and R^{11}, which may be the same or different, represent hydrogen, C_1-C_6 alkyl or phenyl); piperidinocarbonyl; morpholinocarbonyl which may or may not be substituted with one or two C_1-C_4 alkyls; a substituent of the formula,



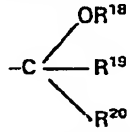
(in which R^{12} represents hydrogen or C_1-C_5 alkyl, and R^{13} represents formyl, C_2-C_{12} alkoxycarbonyl, or C_2-C_5 alkoxycarbonyl substituted with halogen or C_1-C_4 alkoxy); a substituent of the formula,



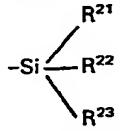
(in which R^{14} represents hydrogen, C_1-C_4 alkyl or C_2-C_6 alkoxyalkyl); a substituent of the formula,



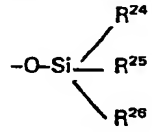
(in which R^{15} and R^{16}, which may be the same or different, represent C_1-C_4 alkyl, or taken together, may form C_1-C_4 alkylene, R^{17} represents C_1-C_5 alkyl, cyano or C_2-C_6 alkoxycarbonyl, and B represents oxygen or sulfur); a substituent of the formula,



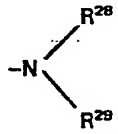
(in which R^{18} represents hydrogen or C_2-C_4 alkylcarbonyl, and R^{19} and R^{20}, which may be the same or different, represent hydrogen or C_1-C_6 alkyl); a substituent of the formula,



(in which R^{21}, R^{22} and R^{23}, which may be the same or different, represent C_1-C_4 alkyl); or a substituent of the formula,



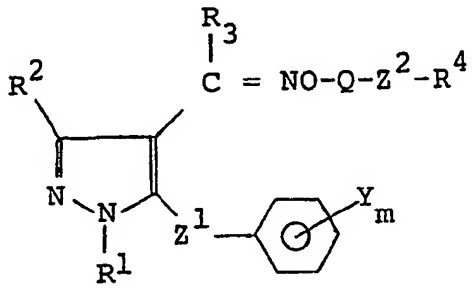
(in which R^{24}, R^{25} and R^{26}, which may be the same or different, represent C_1-C_4 alkyl), and n represents an integer of from 1 to 5, and when n represents an integer of from 2 to 5, X may be the same or different]; Y represents hydrogen, C_1-C_6 alkyl, C_1-C_4 haloalkyl, halogen, hydroxy, C_1-C_4 alkoxy, C_1-C_6 haloalkoxy, C_1-C_3 alkylenedioxy, phenoxy which may or may not be substituted with trifluoromethyl, a substistuent of the formula, $-S(O)_qR^{27}$ (in which R^{27} represents C_1-C_3 alkyl and q represents an integer of 0, 1 or 2), hydroxycarbonyl, C_2-C_5 alkoxycarbonyl or a substituent of the formula,



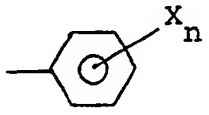
(in which R^{28} and R^{29}, which may be the same or different, represent hydrogen, C_1-C_4 alkyl, or benzyl which may or may not be substituted with C_2-C_6 alkoxycarbonyl); Z^1 represents oxygen or sulfur; Z^2 represents oxygen, sulfur or single bond; Q represents C_1-C_8 alkylene, C_1-C_8 alkylene substituted with halogen or phenyl, C_3-C_{12} alkenylene, C_3-C_{12} haloalkenylene or C_3-C_6 alkynylene; and m represents an integer of from 1 to 3, and when m represents an integer of 2 or 3, Y may be the same or different; and the method of controlling said pests by using the same oxime derivative.

A PYRAZOLE OXIME DERIVATIVE AND ITS PRODUCTION AND USE

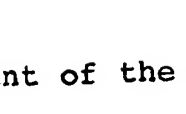
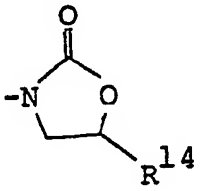
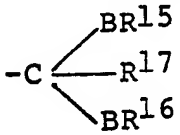
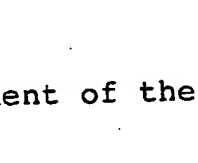
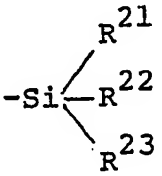
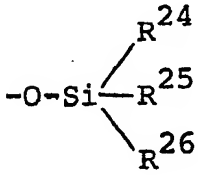
The present invention relates to a pyrazole oxime derivative, its production and an insecticidal and acaricidal composition containing it as an active ingredient for use in agriculture and horticulture, said pyrazole oxime derivative being represented by the general formula (I),



(I)

wherein R^1 represents C_1-C_4 alkyl or phenyl; R^2 represents hydrogen, C_1-C_5 alkyl, C_1-C_3 haloalkyl or phenyl; R^3 represents hydrogen, C_1-C_4 alkyl or phenyl; R^4 represents hydrogen, C_2-C_4 alkylcarbonyl, benzoyl, naphthyl or a substituent of the formula,  [in which X represents hydrogen; halogen; C_1-C_{12} alkyl; C_1-C_6 alkyl substitutd with halogen, cyano, hydroxy, C_1-C_5 alkoxy or C_2-C_6 alkoxycarbonyl; C_3-C_8 cycloakyl; cycloalkyl substituted with from one to three members selected from the group consisting of C_1-C_4 alkyl, halogen and cyano; C_2-C_4 alkenyl substituted with halogen, hydroxy, C_2-C_4 alkoxycarbonyl or C_2-C_6 alkylcarbonyl; phenyl; hydroxy; C_1-C_6 alkoxy; C_1-C_4 alkoxy substituted

with halogen or C_2-C_6 alkoxycarbonyl; phenoxy which may or may not be substituted with C_1-C_3 haloalkyl; benzyloxy; C_1-C_3 alkylenedioxy formed by two adjacent Xs; pyridyloxy which may or may not be substituted with halogen or C_1-C_3 haloalkyl; a substituent of the formula, $-S(O)_pR^5$ (in which R^5 represents C_1-C_6 alkyl, C_1-C_5 haloalkyl or phenyl, and p represents an integer of 0, 1 or 2); cyano; formyl; nitro; a substituent of the formula $-COOR^6$ {in which R^6 represents hydrogen; alkali metal; C_1-C_{10} alkyl; C_1-C_5 alkyl substituted with halogen, C_1-C_4 alkoxy, phenoxy, C_2-C_4 alkoxycarbonyl or phenoxyphenyl; C_2-C_7 alkenyl; C_3-C_7 alkynyl; C_3-C_8 cycloalkyl; C_3-C_8 cycloalkyl substituted with C_1-C_3 alkyl; phenyl; or a substituent of the formula, $-S_n\begin{matrix}R^7\\R^8\\R^9\end{matrix}$ (in which R^7, R^8 and R^9, which may be the same or different, represent C_1-C_4 alkyl or C_3-C_8 cycloalkyl)}; C_2-C_6 alkylcarbonyl; C_2-C_6 alkylcarbonyl substituted with cyano or C_2-C_6 alkoxycarbonyl; benzoyl which may or may not be substituted with halogen or C_1-C_6 alkyl; C_2-C_6 alkylthiocarbonyl; C_3-C_7 alkoxycarbonylcarbonyl; a substituent of the formula, $-C(=O)N\begin{matrix}R^{10}\\R^{11}\end{matrix}$ (in which R^{10} and R^{11}, which may be the same or different, represent hydrogen, C_1-C_6 alkyl or phenyl); piperidinocarbonyl; morpholinocarbonyl which may or may not be substituted with one or two C_1-C_4 alkyls; a

substituent of the formula,  (in which R^{12} represents hydrogen or C_1-C_5 alkyl, and R^{13} represents formyl, C_2-C_{12} alkoxycarbonyl, or C_2-C_5 alkoxycarbonyl substituted with halogen or C_1-C_4 alkoxy); a substituent of the formula,  (in which R^{14} represents hydrogen, C_1-C_4 alkyl or C_2-C_6 alkoxyalkyl); a substituent of the formula,  (in which R^{15} and R^{16}, which may be the same or different, represent C_1-C_4 alkyl or, taken together, may form C_1-C_4 alkylene, R^{17} represents C_1-C_5 alkyl, cyano or C_2-C_6 alkoxycarbonyl, and B represents oxygen or sulfur); a substituent of the formula,  (in which R^{18} represents hydrogen or C_2-C_4 alkylcarbonyl, and R^{19} and R^{20}, which may be the same or different, represent hydrogen or C_1-C_6 alkyl); a substituent of the formula,  (in which R^{21}, R^{22} and R^{23}, which may be the same or different, represent C_1-C_4 alkyl); or a substituent of the formula,  (in which R^{24}, R^{25}, and R^{26}, which may be the same or different, represent C_1-C_4 alkyl), and n represents

an integer of from 1 to 5, and when n represents an integer of from 2 to 5, X may be the same or different]; Y represents hydrogen, C_1-C_6 alkyl, C_1-C_4 haloalkyl, halogen, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_3 alkylenedioxy, phenoxy which may or may not be substituted with trifluoromethyl, a substituent of the formula, $-S(O)_qR^{27}$ (in which R^{27} represents C_1-C_3 alkyl and q represents an integer of 0, 1 or 2), hydroxycarbonyl, C_2-C_5 alkoxycarbonyl or a substituent of the formula, $-N\begin{matrix}R^{28}\\R^{29}\end{matrix}$ (in which R^{28} and R^{29}, which may be the same or different, represent hydrogen, C_1-C_4 alkyl, or benzyl which may or may not be substituted with C_2-C_6 alkoxycarbonyl); Z^1 represents oxygen or sulfur; Z^2 represents oxygen, sulfur or single bond; Q represents C_1-C_8 alkylene, C_1-C_8 alkylene substituted with halogen or phenyl, C_3-C_{12} alkenylene, C_3-C_{12} haloalkenylene or C_3-C_6 alkynylene; and m represents an integer of from 1 to 3, and when m represents an integer of 2 or 3, Y may be the same or different.

The terms "alkyl, alkylene, alkenylene and alkynylene" as used herein mean straight-chain or branched alkyl, alkylene, alkenylene and alkynylene groups, respectively. The term "halo" means halogen such as fluorine, bromine, chlorine, etc., and the term "haloalkyl" means an alkyl group substituted with one or more halogen atoms which may be the same or different.

The compounds represented by the foregoing

general formula (I) are novel compounds not described in the literatrues. They have excellent insecticidal activity against insects belonging to Lepidoptera such as diamond-back moth, cabbage armyworm, tobacco cutworm, rice stem borer, etc., insects belonging to Hemiptera such as brown planthoper, green peach aphid, etc. and mites. In addition, they have excellent fungicidal activity against diseases of vegetables, fruit trees, flowers and ornamental plants, etc., such as rice blast, powdery mildew, downy mildew, crown rust, leaf blight, sheath blight, purple stain, etc.

Of the compounds of the present invention, those which are particularly useful as an insecticide and acaricide will be shown below:

Tert-butyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate

Tert-butyl 4-[{5-(4-fluorophenoxy)-1,3-dimethyl-pyrazol-4-yl}-methyleneaminooxymethyl]benzoate

Tert-pentyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate

Cyclohexyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate

1-Methylcyclohexyl 4-[(1,3-dimethyl-5-phenoxy-pyrazol-4-yl)methyleneaminooxymethyl]benzoate

2-Chloromethyl-2-propyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate

Tert-pentyl 4-[(1-methyl-5-phenoxy-3-trifluoro-methylpyrazol-4-yl)methyleneaminooxymethyl]benzoate

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-tert-butylbenzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(1-cyanocyclopentyl)benzyl ether

1,3-Dimethyl-5-phenoxypyraxole-4-carbaldehyde oxime O-4-(2,2-dichloro-1-methylcyclopropyl)benzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-trimethylsilylbenzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(1,1,2,2-tetrafluoroethoxy)benzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-tert-butoxybenzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(heptafluoropropylthio)benzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(heptafluoropropylsulfinyl)benzyl ether

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(1,1,2,2-tetrafluoroethylthio)benzyl ether

N,N-diisopropyl 4-[(1,3-dimethyl-5-phenoxy-pyrazol-4-yl)methyleneaminooxymethyl]benzamide

Tert-butyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]phenyl ketone

2-Isopropyl-2-[4-{(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl}phenyl]-1,3-dioxolane

2-Isopropyl-2-[4-{(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl}phenyl]-1,3-dithiolane

Tert-butyl N-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]phenyl-N-ethylcarbamate

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-2-(4-tert-butylphenoxy)ethyl ether

Also, compounds particularly useful as a fungicide will be shown below:

Isopropyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate

Isopropyl 4-[{5-(4-fluorophenoxy)-1,3-dimethyl-pyrazol-4-yl}-methyleneaminooxymethyl]benzoate

1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(methythio)benzyl ether

1,3-Dimethyl-5-phenoxypyraxole-4-carbaldehyde oxime O-4-(difluoromethylsulfinyl)benzyl ether

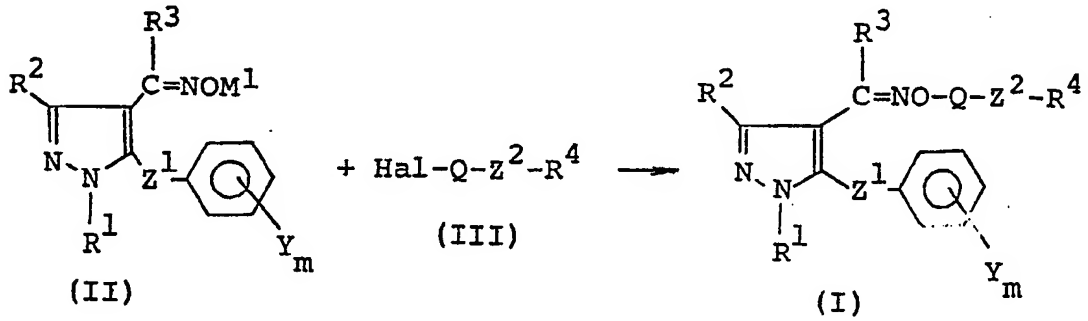
N,N-dimethyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzamide

Methyl N-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)-methyleneaminooxymethyl]phenyl-N-ethylcarbamate

5-Ethyl-3-[N'-4-{(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl}phenyl]-2-oxazolidone

The compounds represented by the general formula (I) can be synthesized, for example, by methods A, B, C and D shown below in chemical formulae.

Method A:



wherein R^1, R^2, R^3, R^4, Q, Y, Z^1, Z^2, m and n are as defined above, Hal represents a halogen atom and M^1 represents a hydrogen atom or an alkali metal atom.

The pyrazole oxime derivatives represented by the general formula (I) can be obtained by reacting a compound of the general formula (II) with a compound of the general formula (III) in an inert solvent in the presence or absence of a base.

Solvents which can be used in the present invention may be any of those not disturbing the reaction, and include for example alcohols (e.g. isopropanol, tert-butanol, diethylene glycol), ketones (e.g. acetone, methyl ethyl ketone, cyclohexanone), ethers (e.g. diethyl ether, diisopropyl ether, tetrahydrofuran, dioxane, monoglyme, diglyme), halogenated hydrocarbons (e.g. dichloroethane, chloroform, carbon tetrachloride, tetrachloroethane), aromatic hydrocarbons (e.g. benzene, chlorobenzene, nitrobenzene, toluene), nitriles (e.g. acetonitrile), dimethyl sulfoxide, dimethylformamide and water. These solvents can be used alone or in combination. When a two-phase reaction is carried out using the solvents in combination, phase transfer catalysts such as triethylbenzylammonium chloride, trioctylmethylammonium chloride, etc. may be used.

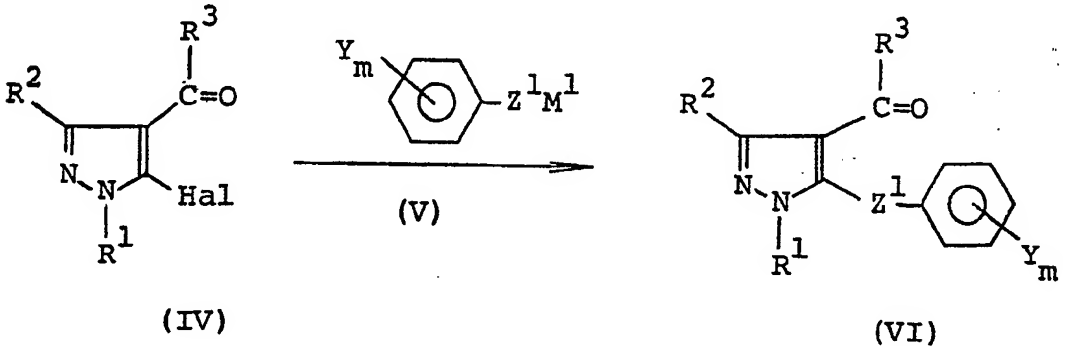
For the base, inorganic and organic bases can be used. The inorganic bases include for example alkali or alkaline earth metal carbonates such as sodium carbonate, potassium carbonate, calcium carbonate, sodium

hydrogencarbonate, etc., alkali or alkaline earth metal hydroxides such as sodium hydroxide, potassium hydroxide, calcium hydroxide, etc., and alkali metal hydrides such as lithium hydride, sodium hydride, etc.

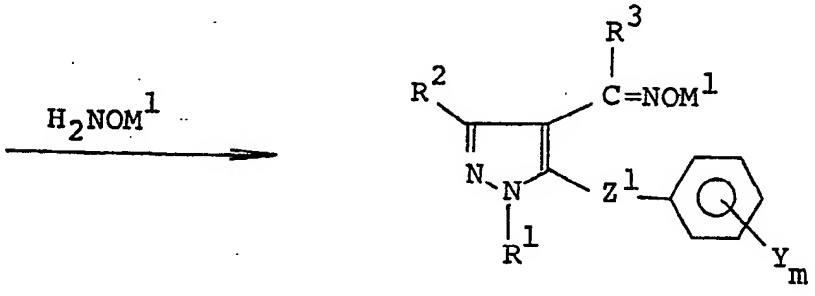
The organic bases include for example diethylamine, triethylamine, pyridine, 4-dimethylaminopyridine, etc.

As to the amount of the base used, it suffices to use an amount equimolar to the compound represented by the general formula (II), but amounts in excess thereof will do.

The compound of the general formula (II) used in the present invention can be produced, for example, by the method described below:



(IV) (V) (VI)



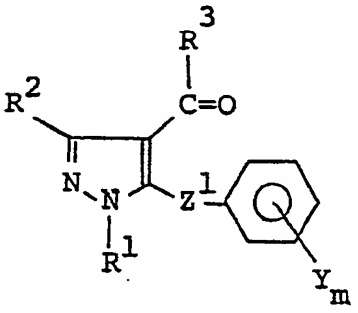
(II)

wherein R^1, R^2, R^3, Y, Z^1, m, Hal and M^1 are as defined above.

That is, the compound of the general formula (II) can be produced by reacting a compound of the general formula (IV) with a compound of the general formula (V) in a suitable solvent and subsequently reacting the resulting compound of the general formula (VI) with hydroxylamine.

Among the compounds represented by the general formula (III), especially when Q is methylene, Z^2 is a single bond and R^4 is a substituted phenyl group, are also some novel compounds, but they can be produced in the same manner as in the case of the known compounds.

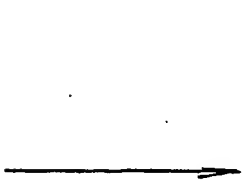
Method B:

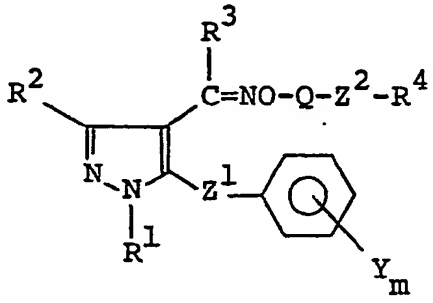


(VI)

+ $H_2NO - Q - Z^2 - R^4$

(VII)





(I)

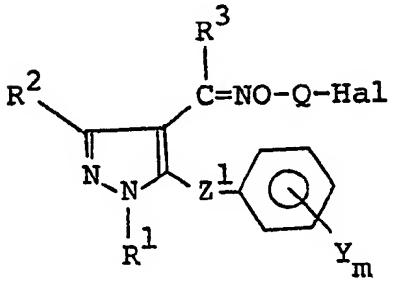
wherein R^1, R^2, R^3, R^4, Q, Y, Z^1, Z^2, m and n are as defined above.

The pyrazole oxime derivatives represented by the general formula (I) can be obtained by reacting a compound of the general formula (VI) with a compound of the general formula (VII) in an inert solvent.

For the solvent which can be used in this reaction, there are mentiond the solvents except ketones shown in Method A.

The compound represented by the general formula (VII) can be produced according to the well-known method, for example, described in Methoden der Organishen Chemie (Hougen Weyl) Band X/I Stickstoffverbindungen Teil I, P 1192.

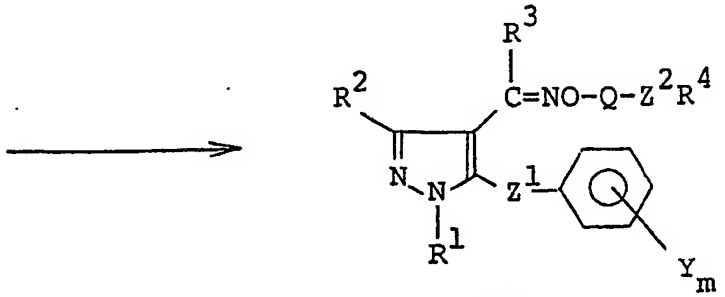
Method C:



(VIII)

$+ M^2Z^2R^4$

(IX)



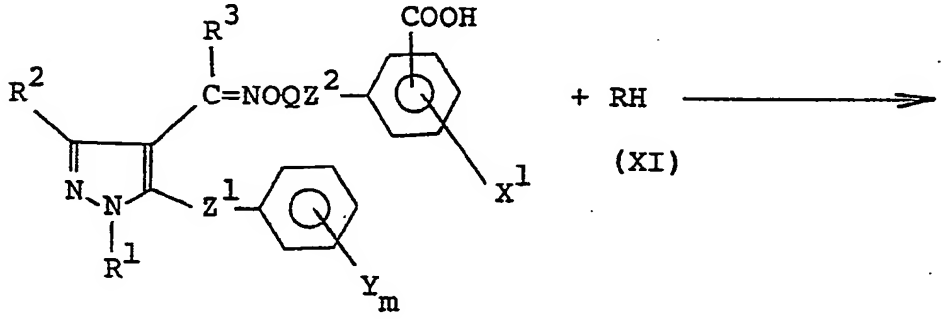
(I)

wherein R^1, R^2, R^3, R^4, Q, Y, Z^1, Z^2, m and n are as defined above, and M^2 represents a hydrogen atom or an alkali metal atom.

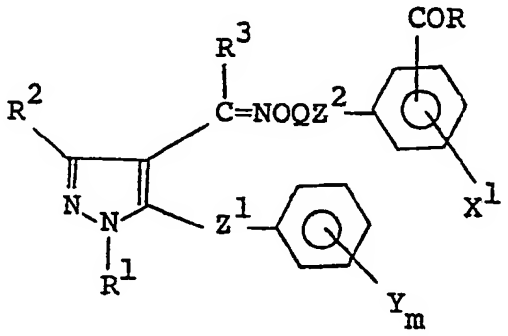
The pyrazole oxime derivatives represented by the general formula (I) can be obtained by reacting a compound of the general formula (VIII) with a compound of the general formula (IX) in an inert solvent in the presence or absence of a base.

For the solvent and base which can be used in this reaction, there are mentioned the solvents and bases shown in Method A.

Method D:



(X) (XI)



(Ia)

wherein R^1, R^2, R^3, Q, Y, Z^1, Z^2 and m are as defined above; X^1 represents hydrogen or C_1-C_4 alkyl; and R represents a substituent of the formula, -OW {in which W represents alkali metal; C_1-C_{10} alkyl; alkyl substituted with halogen, C_1-C_4 alkoxy, phenoxy, C_2-C_4 alkoxycarbonyl or phenyl; C_2-C_7 alkenyl; C_3-C_8 cycloalkyl; C_3-C_8 cycloalkyl substituted with C_1-C_3 alkyl; phenyl; or a substituent of the formula, $-S_n-\begin{matrix} R^7 \\ R^8 \\ R^9 \end{matrix}$ (in which R^7, R^8, R^9, which may be the same or different, represent C_1-C_4 alkyl or C_3-C_8 cycloalkyl)}, a substituent of the formula, $-N\begin{matrix} R^{10} \\ R^{11} \end{matrix}$ (in which R^{10} and R^{11}, which may be the same or different, represent hydrogen, C_1-C_6 alkyl or phenyl); piperidino; morpholino which may or may not be substituted with one or two C_1-C_4 alkyls; or C_2-C_6 alkylthio.

That is, the pyrazole oxime derivatives represented by the general formula (Ia) can be obtained by reacting a compound of the general formula (X) with a compound of the general formula (XI) in an inert solvent in the presence of a dehydrating agent. The compound (X) may be reacted with the compound (XI) after converting it to acid chloride.

Solvents which can be used in this reaction may be any of those not disturbing the reaction, and

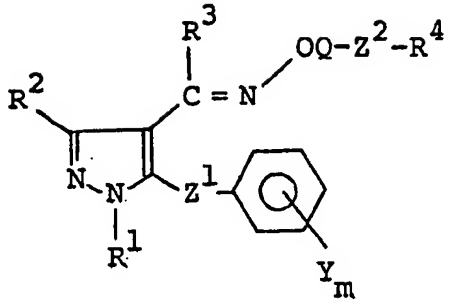
include for example ethers (e.g. diethyl ether, tetrahydrofuran, dioxane, diethylene glycol), halogenated hydrocarbons (e.g. dichloromethane, chloroform, carbon tetrachloride), dimethyl sulfoxide, dimethylformamide, etc. These solvents may be used alone or in combination.

In the methods A to D, the reaction temperature may properly be selected from a range of from room temperature to the boiling point of the solvent. The reaction time depends upon the reaction temperature and reaction scale, but it may properly be selected from a range of from 1 minute to 48 hours.

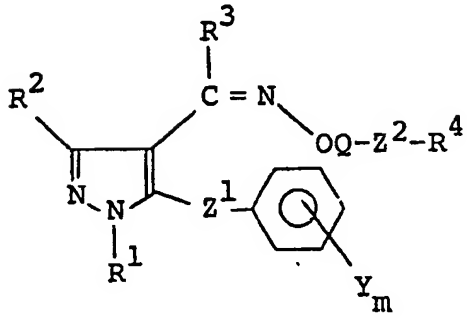
As to the molar ratio of the reagents in practicing the reaction of the present invention, they are used in equimolar amounts because this reaction is an equimolar reaction, but either one of them may be used in excess of the other.

After completion of the reaction, the desired compound can be separated by the usual methods, and if necessary, can be purified by recrystallization, column chromatography, etc.

The pyrazole oxime derivatives represented by the general formula (I) have two isomers, E-isomer and Z-isomer. In the scope of the present invention are also included the both isomers and their mixtures.



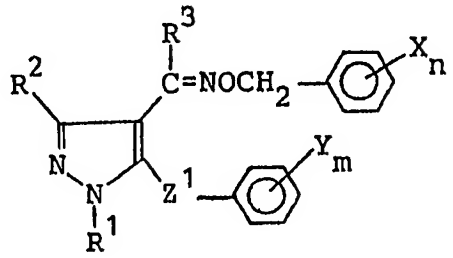
E-isomer



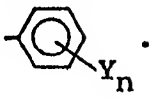
Z-isomer

Representative examples of the pyrazole oxime derivatives represented by the general formula (I) will be shown in Table 1, but the derivatives are not limited to these examples.

Table 1(a)



(Ib)

This formula corresponds to the general formula (I) wherein Q is a methylene group, Z^2 is a single bond and R^4 is  .

Compound No.	R^1	R^2	R^3	X_n	Y_m	Z^1	Physical property m.p. (°C) or refractive index
1	CH_3	CH_3	H	2-$COOCH_3$	H	O	n_D^{20} 1.5772
2	CH_3	CH_3	H	2-$COOCH_3$	4-F	O	n_D^{20} 1.5656
3	CH_3	CH_3	H	2-$COOCH_3$	4-Cℓ	O	n_D^{20} 1.5788
4	CH_3	CH_3	H	2-$COOCH_3$	4-OCH_3	O	n_D^{20} 1.5654
5	CH_3	CH_3	H	2-$COOC_4H_9$-t	H	O	n_D^{20} 1.5462
6	CH_3	CH_3	H	2-$COOC_4H_9$-t	4-F	O	n_D^{20} 1.5446
7	CH_3	CH_3	H	2-$COOC_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5579

- Cont'd -

Table 1(a) (Cont'd)

8	CH_3	CH_3	H	3-$COOC_4H_9$-t	H	O	n_D^{20} 1.5548
9	CH_3	CH_3	H	3-$COOC_4H_9$-t	4-F	O	n_D^{20} 1.5457
10	CH_3	CH_3	H	3-$COOC_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5560
11	CH_3	CH_3	H	3-$COOC(CH_3)_2C_2H_5$	H	O	n_D^{20} 1.5429
12	CH_3	CH_3	H	3-$COOC(CH_3)_2C_2H_5$	3-F	O	n_D^{20} 1.5501
13	CH_3	CH_3	H	3-$COOC(CH_3)_2C_2H_5$	4-OCH_3	O	n_D^{20} 1.5555
14	CH_3	CH_3	H	4-COOH	H	O	m.p. 183.3
15	CH_3	CH_3	H	4-COONa	H	O	m.p. >300
16	CH_3	CH_3	H	4-$COOCH_3$	H	O	n_D^{20} 1.5612
17	CH_3	CH_3	H	4-$COOCH_3$	4-F	O	m.p. 66.0
18	CH_3	CH_3	H	4-$COOCH_3$	4-Cℓ	O	n_D^{20} 1.5800
19	CH_3	CH_3	H	4-$COOCH_3$	4-OCH_3	O	m.p. 55.7
20	CH_3	CH_3	H	4-$COOC_2H_5$	H	O	n_D^{20} 1.5613
21	CH_3	CH_3	H	4-$COOC_2H_5$	4-F	O	n_D^{20} 1.5561
22	CH_3	CH_3	H	4-$COOC_2H_5$	4-Cℓ	O	n_D^{20} 1.5658
23	CH_3	CH_3	H	4-$COOC_2H_5$	4-OCH_3	O	n_D^{20} 1.5664
24	CH_3	CH_3	H	4-$COOC_3H_7$-n	H	O	n_D^{20} 1.5660

- Cont'd -

Table 1(a) (Cont'd)

25	CH_3	CH_3	H	4-$COOC_3H_7$-n	4-F	O	n_D^{20} 1.5579
26	CH_3	CH_3	H	4-$COOC_3H_7$-n	4-OCH_3	O	n_D^{20} 1.5628
27	CH_3	CH_3	H	4-$COOC_3H_7$-i	H	O	n_D^{20} 1.5321
28	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-CH_3	O	n_D^{20} 1.5608
29	CH_3	CH_3	H	4-$COOC_3H_7$-i	3-C_2H_5	O	n_D^{20} 1.5512
30	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-C_2H_5	O	n_D^{20} 1.5579
31	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-C_4H_9-t	O	n_D^{20} 1.5471
32	CH_3	CH_3	H	4-$COOC_3H_7$-i	2-F	O	n_D^{20} 1.5523
33	CH_3	CH_3	H	4-$COOC_3H_7$-i	3-F	O	n_D^{20} 1.5531
34	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-F	O	n_D^{20} 1.5541
35	CH_3	CH_3	H	4-$COOC_3H_7$-i	3-Cl	O	n_D^{20} 1.5610
36	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-Cl	O	n_D^{20} 1.5608
37	CH_3	CH_3	H	4-$COOC_3H_7$-i	2,4-Cl_2	O	n_D^{20} 1.5640
38	CH_3	CH_3	H	4-$COOC_3H_7$-i	3,4-Cl_2	O	n_D^{20} 1.5648
39	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-Br	O	n_D^{20} 1.5618
40	CH_3	CH_3	H	4-$COOC_3H_7$-i	2-OCH_3	O	n_D^{20} 1.5586
41	CH_3	CH_3	H	4-$COOC_3H_7$-i	3-OCH_3	O	n_D^{20} 1.5585

- Cont'd -

Table 1(a) (Cont'd)

42	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-OCH_3	O	n_D^{20} 1.5597
43	CH_3	CH_3	H	4-$COOC_3H_7$-i	3,5-$(OCH_3)_2$	O	n_D^{20} 1.5621
44	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-OC_2H_5	O	n_D^{20} 1.5536
45	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-SCH_3	O	n_D^{20} 1.5819
46	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-$S(O)CH_3$	O	n_D^{20} 1.5729
47	CH_3	CH_3	H	4-$COOC_3H_7$-i	4-$S(O)_2CH_3$	O	n_D^{20} 1.5633
48	CH_3	CH_3	H	4-$COOC_3H_7$-i	3,4(-OCH_2O-)	O	n_D^{20} 1.5593
49	CH_3	CH_3	H	4-$COOC_3H_7$-i	3-$N(CH_3)_2$	O	n_D^{20} 1.5649
50	CH_3	CH_3	H	4-$COOC_4H_9$-n	H	O	n_D^{20} 1.5619
51	CH_3	CH_3	H	4-$COOC_4H_9$-n	4-F	O	n_D^{20} 1.5536
52	CH_3	CH_3	H	4-$COOC_4H_9$-n	4-Cℓ	O	n_D^{20} 1.5629
53	CH_3	CH_3	H	4-$COOC_4H_9$-n	4-OCH_3	O	n_D^{20} 1.5536
54	CH_3	CH_3	H	4-$COOC_4H_9$-s	H	O	n_D^{20} 1.5602
55	CH_3	CH_3	H	4-$COOC_4H_9$-s	4-F	O	n_D^{20} 1.5541
56	CH_3	CH_3	H	4-$COOC_4H_9$-s	4-OCH_3	O	n_D^{20} 1.5594
57	CH_3	CH_3	H	4-$COOC_4H_9$-i	H	O	n_D^{20} 1.5629
58	CH_3	CH_3	H	4-$COOC_4H_9$-i	4-F	O	n_D^{20} 1.5561

- Cont'd -

Table 1(a) (Cont'd)

59	CH_3	CH_3	H	4-$COOC_4H_9$-i	4-OCH_3	o	n_D^{20} 1.5608
60	CH_3	CH_3	H	4-$COOC_4H_9$-t	H	o	m.p. 101.7
61	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-CH_3	o	m.p. 73.0
62	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-C_2H_5	o	n_D^{20} 1.5542
63	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-C_2H_5	o	n_D^{20} 1.5440
64	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-C_4H_9-t	o	n_D^{20} 1.5423
65	CH_3	CH_3	H	4-$COOC_4H_9$-t	2-F	o	m.p. 92.1
66	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-F	o	m.p. 73.9
67	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-F	o	m.p. 86.8
68	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-Cℓ	o	n_D^{20} 1.5632
69	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-Cℓ	o	Paste
70	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-Br	o	n_D^{20} 1.5660
71	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-CF_3	o	n_D^{20} 1.5150
72	CH_3	CH_3	H	4-$COOC_4H_9$-t	2-OCH_3	o	m.p. 72.3
73	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-OCH_3	o	n_D^{20} 1.5663
74	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-OCH_3	o	n_D^{20} 1.5566
75	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-OH	o	m.p. 145.0

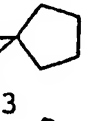
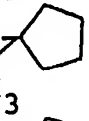
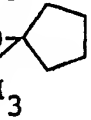
Cont'd -

Table 1(a) (Cont'd)

76	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-OC_2H_5	O	n_D^{20} 1.5487
77	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-SCH_3	O	n_D^{20} 1.5653
78	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-$S(O)CH_3$	O	n_D^{20} 1.5620
79	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-$S(O)_2CH_3$	O	n_D^{20} 1.5521
80	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-$CO_2C_3H_7$-n	O	n_D^{20} 1.5641
81	CH_3	CH_3	H	4-$COOC_4H_9$-t	3,4(-OCH_2O-)	O	n_D^{20} 1.5515
82	CH_3	CH_3	H	4-$COOC_4H_9$-t	3-$N(CH_3)_2$	O	n_D^{20} 1.5538
83	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-$NHCH_2$  $CO_2C_4H_9$-t	O	n_D^{20} 1.5605
84	CH_3	CH_3	H	4-$COOC_4H_9$-t	4-$N(CH_2$  $CO_2C_4H_9$-t$)_2$	O	n_D^{20} 1.5689
85	CH_3	CH_3	H	4-$COOC(CH_3)_2C_2H_5$	H	O	n_D^{20} 1.5564
86	CH_3	CH_3	H	4-$COOC(CH_3)_2C_2H_5$	3-F	O	n_D^{20} 1.5413
87	CH_3	CH_3	H	4-$COOC(CH_3)_2C_2H_5$	4-F	O	n_D^{20} 1.5529
88	CH_3	CH_3	H	4-$COOC(CH_2)_2C_2H_5$	3-OCH_3	O	n_D^{20} 1.5530
89	CH_3	CH_3	H	4-$COOC(CH_3)_2C_2H_5$	4-OCH_3	O	n_D^{20} 1.5592
90	CH_3	CH_3	H	4-$COOCH(C_2H_5)_2$	H	O	n_D^{20} 1.5590
91	CH_3	CH_3	H	4-$COOCH(C_2H_5)_2$	4-F	O	n_D^{20} 1.5502

- Cont'd -

Table 1(a) (Cont'd)

92	CH_3	CH_3	H	4-$COOCH(C_2H_5)_2$	4-OCH_3	O	n_D^{20} 1.5591
93	CH_3	CH_3	H	4-$COOCH_2C_4H_9$-t	H	O	n_D^{20} 1.5538
94	CH_3	CH_3	H	4-$COOCH_2C_4H_9$-t	4-F	O	n_D^{20} 1.5470
95	CH_3	CH_3	H	4-$COOCH_2C_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5509
96	CH_3	CH_3	H		H	O	n_D^{20} 1.5653
97	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5537
98	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5695
99	CH_3	CH_3	H		H	O	n_D^{20} 1.5604
100	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5525
101	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5599
102	CH_3	CH_3	H	4-$COOC(CH_3)_2CH=CH_2$	H	O	n_D^{20} 1.5611
103	CH_3	CH_3	H	4-$COOC(CH_3)_2CH=CH_2$	4-F	O	n_D^{20} 1.5558
104	CH_3	CH_3	H	4-$COOC(CH_3)_2CH=CH_2$	4-OCH_3	O	n_D^{20} 1.5620

- Cont'd -

Table 1(a) (Cont'd)

105	CH_3	CH_3	H	4-$COOCH(C_2H_5)C\equiv CH$	H	O	n_D^{20} 1.5633
106	CH_3	CH_3	H	4-$COOC_6H_{13}$-n	H	O	n_D^{20} 1.5543
107	CH_3	CH_3	H	4-$COOC_6H_{13}$-n	4-F	O	n_D^{20} 1.5468
108	CH_3	CH_3	H	4-$COOC_6H_{13}$-n	4-OCH_3	O	n_D^{20} 1.5549
109	CH_3	CH_3	H	4-$COOC(CH_3)_2C_3H_7$-i	H	O	n_D^{20} 1.5525
110	CH_3	CH_3	H	4-$COOC(CH_3)_2C_3H_7$-i	3-F	O	n_D^{20} 1.5465
111	CH_3	CH_3	H	4-$COOC(CH_3)_2C_3H_7$-i	4-F	O	n_D^{20} 1.5425
112	CH_3	CH_3	H	4-$COOC(C_2H_5)_2CH_3$	H	O	n_D^{20} 1.5480
113	CH_3	CH_3	H	4-$COOC(C_2H_5)_2CH_3$	4-F	O	n_D^{20} 1.5431
114	CH_3	CH_3	H	4-$COOC(C_2H_5)_2CH_3$	4-OCH_3	O	n_D^{20} 1.5540
115	CH_3	CH_3	H	4-$COOCH(CH_3)C_4H_9$-t	H	O	n_D^{20} 1.5529
116	CH_3	CH_3	H	4-$COOCH(CH_3)C_4H_9$-t	4-F	O	n_D^{20} 1.5478
117	CH_3	CH_3	H	4-$COOCH(CH_3)C_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5509
118	CH_3	CH_3	H	4-COO- 	H	O	Paste
119	CH_3	CH_3	H	4-COO- 	4-F	O	n_D^{20} 1.5863

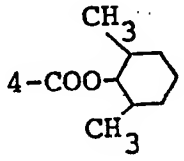
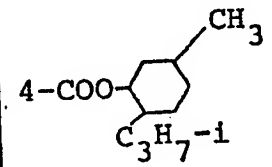
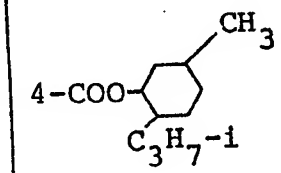
- Cont'd -

Table 1(a) (Cont'd)

120	CH_3	CH_3	H	4-COO- 	4-Cℓ	O	n_D^{20} 1.5960
121	CH_3	CH_3	H	4-COO- 	4-OCH_3	O	n_D^{20} 1.5976
122	CH_3	CH_3	H	4-COO-  CH_3	H	O	n_D^{20} 1.5621
123	CH_3	CH_3	H	4-COO-  CH_3	4-F	O	n_D^{20} 1.5511
124	CH_3	CH3	H	4-COO-  CH_3	4-OCH_3	O	n_D^{20} 1.5541
125	CH_3	CH_3	H	4-COO-  CH_3 CH_3	H	O	n_D^{20} 1.5584
126	CH_3	CH_3	H	4-COO-  CH_3 CH_3	4-F	O	n_D^{20} 1.5370

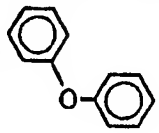
- Cont'd -

Table 1(a) (Cont'd)

127	CH_3	CH_3	H		$4-OCH_3$	O	n_D^{20} 1.5492
128	CH_3	CH_3	H		H	O	n_D^{20} 1.5552
129	CH_3	CH_3	H		$4-OCH_3$	O	n_D^{20} 1.5541
130	CH_3	CH_3	H	$4-COOCH(C_3H_7-i)_2$	H	O	n_D^{20} 1.5471
131	CH_3	CH_3	H	$4-COOCH(C_3H_7-i)_2$	4-F	O	n_D^{20} 1.5400
132	CH_3	CH_3	H	$4-COOCH(C_3H_7-i)_2$	$4-OCH_3$	O	n_D^{20} 1.5490
133	CH_3	CH	H	$4-COOC(C_2H_5)_3$	H	O	n_D^{20} 1.5465
134	CH_3	CH_3	H	$4-COOC(C_2H_5)_3$	4-F	O	n_D^{20} 1.5462
135	CH_3	CH_3	H	$4-COOC(C_2H_5)_3$	$4-OCH_3$	O	n_D^{20} 1.5518
136	CH_3	CH_3	H	$4-COOCH(CH_3)$ 	H	O	n_D^{20} 1.5730

- Cont'd -

Table 1(a) (Cont'd)

137	CH_3	CH_3	H	4-$COOCH_2$ 	H	O	n_D^{20} 1.5901
138	CH_3	CH_3	H	4-$COOC_2H_4O$ 	H	O	n_D^{20} 1.5675
139	CH_3	CH_3	H	4-$COOC_2H_4OCH_3$	H	O	n_D^{20} 1.5672
140	CH_3	CH_3	H	4-$COOCH(CH_3)CH_2OCH_3$	H	O	n_D^{20} 1.5563
141	CH_3	CH_3	H	4-$COOC(CH_3)_2CO_2CH_3$	H	O	n_D^{20} 1.5583
142	CH_3	CH_3	H	4-$COOC_2H_4O$ 	4-F	O	n_D^{20} 1.5655
143	CH_3	CH_3	H	4-$COOC_2H_4O$ 	4-Cℓ	O	n_D^{20} 1.5685
144	CH_3	CH_3	H	4-$COOC_2H_4O$ 	4-OCH_3	O	n_D^{20} 1.5764
145	CH_3	CH_3	H	4-$COOC_2H_4OCH_3$	4-OCH_3	O	n_D^{20} 1.5695
146	CH_3	CH_3	H	4-$COOCH_2CF_3$	H	O	n_D^{20} 1.5491
147	CH_3	CH_3	H	4-$COOCH_2CF_3$	4-F	O	n_D^{20} 1.5409
148	CH_3	CH_3	H	4-$COOCH_2CF_3$	4-Cℓ	O	n_D^{20} 1.5450
149	CH_3	CH_3	H	4-$COOCH_2CF_3$	4-OCH_3	O	n_D^{20} 1.5459

- Cont'd -

Table 1(a) (Cont'd)

150	CH_3	CH_3	H	4-$COOCH(CF_3)_2$	H	O	n_D^{20} 1.5563
151	CH_3	CH_3	H	4-$COOCH(CF_3)_2$	4-F	O	n_D^{20} 1.5632
152	CH_3	CH_3	H	4-$COOCH(CF_3)_2$	4-OCH_3	O	n_D^{20} 1.5664
153	CH_3	CH_3	H	4-$COOCH(CH_2Cl)_2$	H	O	n_D^{20} 1.5451
154	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	H	O	n_D^{20} 1.5662
155	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	3-F	O	n_D^{20} 1.5520
156	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	4-F	O	n_D^{20} 1.5598
157	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	3-Cl	O	n_D^{20} 1.5651
158	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	4-Cl	O	n_D^{20} 1.5639
159	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	3-OCH_3	O	n_D^{20} 1.5602
160	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2Cl$	4-OCH_3	O	n_D^{20} 1.5665
161	CH_3	CH_3	H	4-COO- 	H	O	n_D^{20} 1.5656
162	CH_3	CH_3	H	4-$COOSn(C_4H_9\text{-}n)_3$	H	O	n_D^{20} 1.5600
163	CH_3	CH_3	H	4-COOSn(- )$_3$	H	O	n_D^{20} 1.5603
164	CH_3	CF_3	H	4-$COOC(CH_3)_2C_2H_5$	H	O	n_D^{20} 1.5260

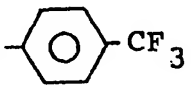
- Cont'd -

Table 1(a) (Cont'd)

165	CH_3	CH_3	CH_3	4-COOH	H	O	Paste
166	CH_3	CH_3	CH_3	4-$COOC_4H_9$-t	H	O	m.p. 94.4
167	CH_3	CH_3	C_2H_5	4-$COOC_4H_9$-t	H	O	n_D^{20} 1.5536
168	CH_3	CH_3		4-$COOC_4H_9$-t	H	O	n_D^{20} 1.5644
169	CH_3	CH_3	CH_3	4-$COOC(CH_3)_2C_2H_5$	H	O	m.p. 60.9
170	CH_3	CH_3	CH_3		H	O	n_D^{20} 1.5570
171	CH_3	CH_3	CH_3	4-$COOC(CH_3)_2CH_2Cl$	H	O	n_D^{20} 1.5578
172	CH_3	C_3H_7-i	H	4-$COOC_3H_7$-i	H	O	n_D^{20} 1.5491
173	CH_3	H	H	4-$COOC_4H_9$-t	H	O	Paste
174	CH_3	CH_3	H	4-$COOC_3H_7$-i	H	S	n_D^{20} 1.5821
175	CH_3	CH_3	H	4-$COOC_4H_9$-t	H	S	m.p. 112.3
176	CH_3	CH_3	H	4-$COOC_4H_9$-t	H	S(O)	n_D^{20} 1.5649
177	CH_3	CH_3	H	4-$COOC_4H_9$-t	H	$S(O)_2$	n_D^{20} 1.5689
178	CH_3	CH_3	H	4-$COOC_4H_9$-t, 5-CH_3	H	O	Paste

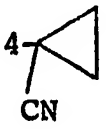
- Cont'd -

Table 1(a) (Cont'd)

179	CH_3	CH_3	H	4-$COOC_4H_9$-t, 3-CH_3	H	O	Paste
180	CH_3	CH_3	H	4-$COOC(CH_3)_2CH_2F$	H	O	Paste
181	CH_3	CH_3	H	H	H	O	n_D^{20} 1.5517
182	CH_3	CH_3	H	H	2-CH_3	O	n_D^{20} 1.5800
183	CH_3	CH_3	H	H	3-CH_3	O	n_D^{20} 1.5778
184	CH_3	CH_3	H	H	2-Cl	O	n_D^{20} 1.5895
185	CH_3	CH_3	H	H	3-Cl	O	n_D^{20} 1.5834
186	CH_3	CH3	H	H	4-Cl	O	n_D^{20} 1.5766
187	CH_3	CH_3	H	H	2,4-Cl_2	O	n_D^{20} 1.5498
188	CH_3	CH_3	H	H	4-OCH_3	O	n_D^{20} 1.5765
189	CH_3	CH_3	H	H	4-O-  -CF_3	O	n_D^{20} 1.5823
190	CH_3	CH_3	H	2-CH_3	H	O	n_D^{20} 1.5773
191	CH_3	CH_3	H	3-CH_3	H	O	n_D^{20} 1.5749
192	CH_3	CH_3	H	4-CH_3	H	O	n_D^{20} 1.5783
193	CH_3	CH_3	H	4-CF_3	H	O	n_D^{20} 1.5468

- Cont'd -

Table 1(a) (Cont'd)

194	CH_3	CH_3	H	4-CF_3	4-F	O	n_D^{20} 1.5355
195	CH_3	CH_3	H	4-CF_3	4-Cl	O	n_D^{20} 1.5539
196	CH_3	CH_3	H	4-C_2H_5	H	O	n_D^{20} 1.5739
197	CH_3	CH_3	H	4-C_3H_7-i	H	O	n_D^{20} 1.5594
198	CH_3	CH_3	H	4-$C(CH_3)_2CN$	H	O	m.p. 77.4
199	CH_3	CH_3	H		H	O	m.p. 109.1
200	CH_3	CH_3	H	4-$C(CH_3)_2CN$	4-F	O	m.p. 94.7
201	CH_3	CH_3	H	4-C_4H_9-n	H	O	n_D^{20} 1.5567
202	CH_3	CH_3	H	4-C_4H_9-n	4-Cl	O	n_D^{20} 1.5665
203	CH_3	CH_3	H	4-C_4H_9-s	H	O	n_D^{20} 1.5631
204	CH_3	CH_3	H	4-C_4H_9-i	H	O	n_D^{20} 1.5628
205	CH_3	CH_3	H	4-C_4H_9-t	H	O	n_D^{20} 1.5402
206	CH_3	CH_3	H	4-C_4H_9-t	3-CH_3	O	n_D^{20} 1.5605
207	CH_3	CH_3	H	4-C_4H_9-t	4-CH_3	O	m.p. 112.4

- Cont'd -

Table 1(a) (Cont'd)

208	CH_3	CH_3	H	4-C_4H_9-t	3-C_2H_5	O	n_D^{20} 1.5539
209	CH_3	CH_3	H	4-C_4H_9-t	4-C_2H_5	O	m.p. 79.0
210	CH_3	CH_3	H	4-C_4H_9-t	4-C_4H_9-t	O	n_D^{20} 1.5475
211	CH_3	CH_3	H	4-C_4H_9-t	2-F	O	m.p. 67.7
212	CH_3	CH_3	H	4-C_4H_9-t	3-F	O	m.p. 66.9
213	CH_3	CH_3	H	4-C_4H_9-t	4-F	O	n_D^{20} 1.5507
214	CH_3	CH_3	H	4-C_4H_9-t	2-Cl	O	n_D^{20} 1.5633
215	CH_3	CH_3	H	4-C_4H_9-t	3-Cl	O	n_D^{20} 1.5573
216	CH_3	CH_3	H	4-C_4H_9-t	4-Cl	O	n_D^{20} 1.5653
217	CH_3	CH_3	H	4-C_4H_9-t	4-Br	O	n_D^{20} 1.5636
218	CH_3	CH_3	H	4-C_4H_9-t	3-CF_3	O	n_D^{20} 1.5352
219	CH_3	CH_3	H	4-C_4H_9-t	2-OCH_3	O	m.p. 76.3
220	CH_3	CH_3	H	4-C_4H_9-t	3-OCH_3	O	n_D^{20} 1.6590
221	CH_3	CH_3	H	4-C_4H_9-t	4-OCH_3	O	n_D^{20} 1.5584
222	CH_3	CH_3	H	4-C_4H_9-t	3,5-$(OCH_3)_2$	O	n_D^{20} 1.5535
223	CH_3	CH_3	H	4-C_4H_9-t	4-OC_2H_5	O	n_D^{20} 1.5555

- Cont'd -

Table 1(a) (Cont'd)

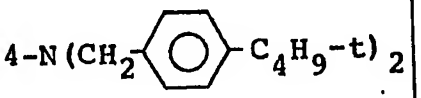
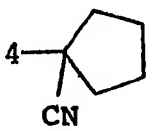
224	CH_3	CH_3	H	4-C_4H_9-t	4-$CO_2C_3H_7$-n	O	n_D^{20} 1.5532
225	CH_3	CH_3	H	4-C_4H_9-t	3,4(-OCH_2O-)	O	m.p. 111.4
226	CH_3	CH_3	H	4-C_4H_9-t	3-$N(CH_3)_2$	O	n_D^{20} 1.5858
227	CH_3	CH_3	H	4-C_4H_9-t		O	n_D^{20} 1.5712
228	CH_3	CH_3	H	4-C_5H_{11}-n	H	O	n_D^{20} 1.5546
229	CH_3	CH_3	H	4-$CH(CH_3)C_3H_7$-n	H	O	n_D^{20} 1.5640
230	CH_3	CH_3	H	4-$CH(CH_3)C_3H_7$-n	4-F	O	n_D^{20} 1.5568
231	CH_3	CH_3	H	4-$CH(CH_3)C_3H_7$-n	4-Cl	O	n_D^{20} 1.5650
232	CH_3	CH_3	H	4-$C(CH_3)_2C_2H_5$	H	O	n_D^{20} 1.5633
233	CH_3	CH_3	H	4-$C(CH_3)_2C_2H_5$	2-F	O	n_D^{20} 1.5440
234	CH_3	CH_3	H	4-$C(CH_3)_2C_2H_5$	4-F	O	n_D^{20} 1.5539
235	CH_3	CH_3	H	4-$C(CH_3)_2C_2H_5$	4-Cl	O	n_D^{20} 1.5678
236	CH_3	CH_3	H	4-$C(CH_3)_2C_2H_5$	4-OCH_3	O	n_D^{20} 1.5584
237	CH_3	CH_3	H		H	O	n_D^{20} 1.5612

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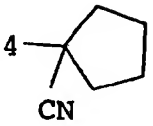
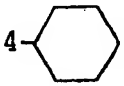
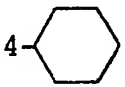
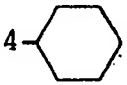
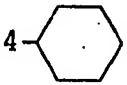
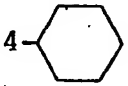
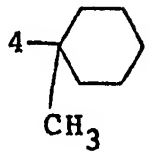
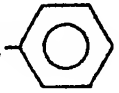
Table 1(a) (Cont'd)

238	CH_3	CH_3	H	4- 	3-OCH_3	O	n_D^{20} 1.5632
239	CH_3	CH_3	H	4-$CH(OH)C_4H_9$-t	H	O	n_D^{20} 1.5500
240	CH_3	CH_3	H	4-$CH(OH)C_4H_9$-t	4-F	O	n_D^{20} 1.5445
241	CH_3	CH_3	H	4-$CH(OH)C_4H_9$-t	4-Cl	O	n_D^{20} 1.5500
242	CH_3	CH_3	H	4-C_6H_{13}-n	H	O	n_D^{20} 1.5545
243	CH_3	CH_3	H	4- 	H	O	n_D^{20} 1.5635
244	CH_3	CH_3	H	4- 	2-F	O	n_D^{20} 1.5591
245	CH_3	CH_3	H	4- 	4-F	O	n_D^{20} 1.5577
246	CH_3	CH_3	H	4- 	4-Cl	O	n_D^{20} 1.5728
247	CH_3	CH_3	H	4- 	3,5-$(OCH_3)_2$	O	n_D^{20} 1.5590
248	CH_3	CH_3	H	4- 	H	O	n_D^{20} 1.5656

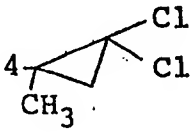
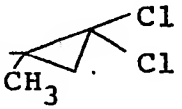
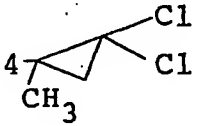
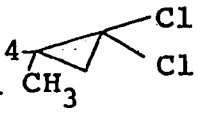
- Cont'd -

Table 1(a) (Cont'd)

249	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5596
250	CH_3	CH_3	H	4-C_7H_{15}-n	H	O	n_D^{20} 1.5480
251	CH3	CH_3	H	4-C_8H_{17}-n	H	O	n_D^{20} 1.5532
252	CH_3	CH_3	H		H	O	m.p. 121.7
253	CH_3	CH_3	H	4-$C(CH_3)_2OCH_3$	H	O	n_D^{20} 1.5645
254	CH_3	CH_3	H	4-$C(CH_3)_2OCH_3$	4-F	O	n_D^{20} 1.5513
255	CH_3	CH_3	H	4-CH=CHCOC_4H_9-t	H	O	n_D^{20} 1.5701
256	CH_3	CH_3	H	4-CH=CHCH(OH)C_4H_9-t	H	O	n_D^{20} 1.5580
257	CH3	CH_3	H	4-CH=CHCOC_4H_9-t	4-F	O	n_D^{20} 1.5526
258	CH_3	CH_3	H	4-CH=CHCOC_4H_9-t	4-OCH_3	O	n_D^{20} 1.5576
259	CH_3	CH_3	H	4-CH=CH$CO_2C_2H_5$	H	O	n_D^{20} 1.5919
260	CH_3	CH_3	H	4-CH=CH$CO_2C_2H_5$	4-F	O	n_D^{20} 1.5821
261	CH_3	CH_3	H	4-CH=CH$CO_2C_2H_5$	4-OCH_3	O	n_D^{20} 1.5887
262	CH_3	CH_3	H	4-CH=CBr_2	H	O	m.p. 109.3

- Cont'd -

Table 1(a) (Cont'd)

263	CH_3	CH_3	H	4-$C(CH_3)_2CO_2C_2H_5$	H	O	n_D^{20} 1.5320
264	CH_3	CH_3	H	4-$C(CH_3)_2CO_2C_2H_5$	4-F	O	n_D^{20} 1.5502
265	CH_3	CH_3	H	4-$C(CH_3)_2CO_2C_3H_7$-i	H	O	n_D^{20} 1.5492
266	CH_3	CH_3	H		H	O	n_D^{20} 1.5680
267	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5654
268	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5660
269	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5653
270	CH_3	CH_3	H	2,4-$(CH_3)_2$	4-F	O	n_D^{20} 1.5654
271	CH_3	CH_3	H	2,4-$(CH_3)_2$	4-Cl	O	n_D^{20} 1.5672
272	CH_3	CH_3	H	3-OCH_3, 4-C_4H_9-t	H	O	n_D^{20} 1.5567
273	CH_3	CH_3	H	3-OCH_3, 4-C_4H_9-t	4-Cl	O	n_D^{20} 1.5572
274	CH_3	CH_3	H	2,4,6-$(CH_3)_3$	H	O	m.p. 94.5

- Cont'd -

Table 1(a) (Cont'd)

275	CH_3	CH_3	H	2,6-$(CH_3)_2$, 4-C_4H_9-t	H	O	m.p. 111.0
276	CH_3	CH_3	H	2,6-$(CH_3)_2$, 4-C_4H_9-t	4-F	O	m.p. 97.9
277	CH_3	CH_3	H	2,6-$(CH_3)_2$, 4-C_4H_9-t	4-Cl	O	Paste
278	CH_3	CH_3	H	2,6-$(CH_3)_2$, 4-C_4H_9-t	4-OCH_3	O	n_D^{20} 1.5528
279	CH_3	H	H	H	4-Cl	O	n_D^{20} 1.5933
280	CH_3	H	H	4-C_4H_9-t	H	O	n_D^{20} 1.5689
281	CH_3	CH_3	CH_3	4-C_4H_9-t	H	O	n_D^{20} 1.5850
282	CH_3	CH_3	C_2H_5	4-C_4H_9-t	H	O	n_D^{20} 1.5536
283	CH_3	CH_3	CH_3	4- 	H	O	n_D^{20} 1.5775
284	CH_3	C_2H_5	H	4-C_4H_9-t	H	O	m.p. 99.2

- Cont'd -

Table 1(a) (Cont'd)

285	CH_3	C_3H_7-i	H	4-C_4H_9-t	H	O	m.p. 71.5
286	CH_3		H	H	4-Cl	O	n_D^{20} 1.5966
287	CH_3		H	4- 	4-Cl	O	n_D^{20} 1.6000
288	C_2H_5	CH_3	H	4-C_4H_9-t	H	O	n_D^{20} 1.5521
289		CH_3	H	4-C_4H_9-t	H	O	n_D^{20} 1.5905
290	CH_3	CH_3	H	H	4-Cl	S	n_D^{20} 1.5562
291	CH_3	CH_3	H	4-C_4H_9-t	H	S	n_D^{20} 1.5760
292	CH_3	CH_3	H	4-$C(CH_3)(CO_2C_2H_5)_2$	H	O	n_D^{20} 1.5515
293	CH_3	CH_3	H	4-$C(CH_3)(CO_2C_2H_5)_2$	4-F	O	n_D^{20} 1.5462
294	CH_3	CH_3	H	4-$C(CH_3)(CO_2C_2H_5)_2$	4-Cl	O	n_D^{20} 1.5567
295	CH_3	CH_3	H	4-$C(CH_3)(CO_2C_2H_5)_2$	4-OCH_3	O	n_D^{20} 1.5553
296	CH_3	CH_3	H	4-C_4H_9-t	4-SCH_3	O	n_D^{20} 1.5853
297	CH_3	CH_3	H	4-C_4H_9-t	4-S(O)CH_3	O	n_D^{20} 1.5698
298	CH_3	CH_3	H	4-C_4H_9-t	4-$S(O)_2CH_3$	O	m.p. 133.6

- Cont'd -

Table 1(a) (Cont'd)

299	CH_3	CH_3	H	4-$C(CH_3)_2CH_2F$	H	O	Paste
300	CH_3	H	H	4-Cl	H	O	n_D^{20} 1.5586
301	CH_3	H	H	4-Cl	4-Cl	O	n_D^{20} 1.5859
302	CH_3	H	H	4-$SCHF_2$	H	O	n_D^{20} 1.5558
303	CH_3	H	H	4-$SCHF_2$	4-Cl	O	n_D^{20} 1.5896
304	CH_3	H	H	4-$S(O)CHF_2$	H	O	n_D^{20} 1.5526
305	CH_3	CH_3	H	4-F	H	O	n_D^{20} 1.5681
306	CH_3	CH_3	H	4-F	4-Cl	O	n_D^{20} 1.5724
307	CH_3	CH_3	H	2,3,4,5,6-F_5	H	O	n_D^{20} 1.5886
308	CH_3	CH_3	H	2-Cl	H	O	n_D^{20} 1.5868
309	CH_3	CH_3	H	2-Cl	4-Cl	O	n_D^{20} 1.5760
310	CH_3	CH_3	H	3-Cl	H	O	n_D^{20} 1.5490
311	CH_3	CH_3	H	3-Cl	4-Cl	O	n_D^{20} 1.5820
312	CH_3	CH_3	H	4-Cl	H	O	n_D^{20} 1.5750
313	CH_3	CH_3	H	4-Cl	H	S	n_D^{20} 1.5563
314	CH_3	CH_3	H	4-Cl	2-Cl	O	n_D^{20} 1.5892

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Table 1(a) (Cont'd)

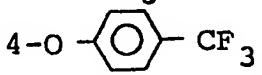
315	CH_3	CH_3	H	4-Cl	3-Cl	O	n_D^{20} 1.5905
316	CH_3	CH_3	H	4-Cl	4-Cl	O	n_D^{20} 1.5785
317	CH_3	CH_3	H	4-Cl	4-Cl	S	m.p. 96.7
318	CH_3	CH_3	H	4-Cl	4-Cl	SO	n_D^{20} 1.5569
319	CH_3	CH_3	H	4-Cl	4-Cl	SO_2	n_D^{20} 1.5642
320	CH_3	CH_3	H	4-Cl	2,4-Cl_2	O	m.p. 117.9
321	CH_3	CH_3	H	4-Cl	4-OCH_3	O	n_D^{20} 1.5809
322	CH_3	CH_3	H	4-Cl		O	m.p. 97.8
323	CH_3	CH_3	H	2,4-Cl_2	4-Cl	O	n_D^{20} 1.5811
324	CH_3	CH_3	H	3,4-Cl_2	4-Cl	O	n_D^{20} 1.5958
325	CH_3	CH_3	H	2,5-Cl_2	4-Cl	O	n_D^{20} 1.5826
326	CH_3	CH_3	H	3,5-Cl_2	4-Cl	O	n_D^{20} 1.5778
327	CH_3	CH_3	H	2,6-Cl_2	4-Cl	O	n_D^{20} 1.5825
328	CH_3	CH_3	H	4-Br	H	O	n_D^{20} 1.5878
329	CH_3	CH_3	H	4-Br	4-Cl	O	n_D^{20} 1.5972
330	CH_3	CH_3	H	4-I	4-Cl	O	n_D^{20} 1.6131

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Table 1(a) (Cont'd)

331	CH_3	CH_3	H	4-CN	H	O	n_D^{20} 1.5882
332	CH_3	CH_3	H	4-NO_2	H	O	n_D^{20} 1.5942
333	CH_3	CH_3	H	4-$Si(CH_3)_3$	H	O	m.p. 50.8
334	CH_3	CH_3	CH_3	4-$Si(CH_3)_3$	H	O	m.p. 61.2
335	CH_3	CH_3	H	4-OH	H	O	m.p. >300
336	CH_3	CH_3	H	4-OCH_3	H	O	n_D^{20} 1.5739
337	CH_3	CH_3	H	4-$OCHF_2$	H	O	n_D^{20} 1.5422
338	CH_3	CH_3	H	4-$OCHF_2$	H	S	n_D^{20} 1.5772
339	CH_3	CH_3	H	4-$OCHF_2$	H	SO	n_D^{20} 1.5583
340	CH_3	CH_3	H	4-$OCHF_2$	4-CH_3	O	n_D^{20} 1.5745
341	CH_3	CH_3	H	4-$OCHF_2$	4-C_4H_9-t	O	n_D^{20} 1.5396
342	CH_3	CH_3	H	4-$OCHF_2$	4-F	O	n_D^{20} 1.5455
343	CH_3	CH_3	H	4-$OCHF_2$	3-Cl	O	n_D^{20} 1.5630
344	CH_3	CH_3	H	4-$OCHF_2$	4-Cl	O	n_D^{20} 1.5584
345	CH_3	CH_3	H	4-$OCHF_2$	3,4-Cl_2	O	n_D^{20} 1.5460
346	CH_3	CH_3	H	4-$OCHF_2$	4-OCH_3	O	n_D^{20} 1.5462

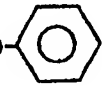
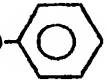
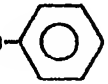
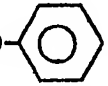
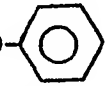
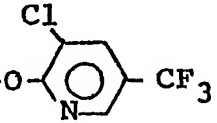
- Cont'd -

Table 1(a) (Cont'd)

347	CH_3	CH_3	H	4-OCF_3	H	O	n_D^{20} 1.5386
348	CH_3	CH_3	H	4-OCF_3	H	S	n_D^{20} 1.5510
349	CH_3	CH_3	H	4-OCF_3	3-Cl	O	n_D^{20} 1.5399
350	CH_3	CH_3	H	4-OCF_3	4-Cl	O	n_D^{20} 1.5244
351	CH_3	CH_3	H	4-OC_2H_5	H	O	n_D^{20} 1.5736
352	CH_3	CH_3	H	4-OC_2H_5	4-Cl	O	n_D^{20} 1.5744
353	CH_3	CH_3	H	4-OCF_2CHF_2	H	O	n_D^{20} 1.5287
354	CH_3	CH_3	C_2H_5	4-OCF_2CHF_2	H	O	n_D^{20} 1.5252
355	CH_3	CH_3	H	4-OCF_2CHF_2	2-F	O	n_D^{20} 1.5130
356	CH_3	CH_3	H	4-OCF_2CHF_2	4-F	O	n_D^{20} 1.5242
357	CH_3	CH_3	H	4-OCF_2CHF_2	4-Cl	O	m.p. 83.8
358	CH_3	CH_3	H	4-OCF_2CHF_2	4-OCH_3	O	n_D^{20} 1.5300
359	CH_3	CH_3	H	4-OC_3H_7-i	H	O	n_D^{20} 1.5686
360	CH_3	CH_3	H	4-OC_3H_7-i	4-F	O	n_D^{20} 1.5665
361	CH_3	CH_3	H	4-OC_3H_7-i	4-Cl	O	n_D^{20} 1.5689
362	CH_3	CH_3	H	4-OC_3H_9-i	4-OCH_3	O	n_D^{20} 1.5642

- Cont'd -

Table 1(a) (Cont'd)

363	CH_3	CH_3	H	4-OC_4H_9-t	H	O	n_D^{20} 1.5562
364	CH_3	CH_3	H	4-OC_4H_9-t	4-F	O	n_D^{20} 1.5682
365	CH_3	CH_3	H	4-OC_4H_9-t	4-Cl	O	m.p. 89.4
366	CH_3	CH_3	H	4-OC_4H_9-t	4-OCH_3	O	n_D^{20} 1.5663
367	CH_3	CH_3	H	3-O- 	H	O	n_D^{20} 1.5896
368	CH_3	CH_3	H	3-O- 	2,4-Cl_2	O	n_D^{20} 1.5586
369	CH_3	CH_3	H	4-O- 	H	O	n_D^{20} 1.5945
370	CH_3	CH_3	H	4-O- 	4-F	O	n_D^{20} 1.5852
371	CH_3	CH_3	H	4-O- 	4-Cl	O	n_D^{20} 1.5921
372	CH_3	CH_3	H	4-O- 	H	O	n_D^{20} 1.5640
373	CH_3	CH_3	H	3,4(-OCH_2O-)	H	O	n_D^{20} 1.5850

- Cont'd -

Table 1(a) (Cont'd)

374	CH_3	CH_3	H	3,4(-OCH_2O-)	4-F	O	n_D^{20} 1.5750
375	CH_3	CH_3	H	3,4(-OCH_2O-)	4-Cl	O	n_D^{20} 1.5867
376	CH_3	CH_3	H	4-$OCH(CH_3)COOC_2H_5$	H	O	n_D^{20} 1.5505
377	CH_3	CH_3	H	4-$OCH(CH_3)COOC_3H_7$-i	H	O	n_D^{20} 1.5447
378	CH_3	CH_3	H	4-$OCH(CH_3)COOC_2H_5$	4-F	O	n_D^{20} 1.5560
379	CH_3	CH_3	H	4-$OCH(CH_3)COOC_2H_5$	4-Cl	O	n_D^{20} 1.5600
380	CH_3	CH_3	H	4-$OCH(CH_3)COOC_2H_5$	4-OCH_3	O	n_D^{20} 1.5431
381	CH_3	CH_3	H	4-$OCH(CH_3)COOC_3H_7$-i	4-OCH_3	O	n_D^{20} 1.5480
382	CH_3	CH_3	H	4-$OCH(CH_3)COOC_4H_9$-t	H	O	n_D^{20} 1.5408

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Table 1(a) (Cont'd)

383	CH_3	CH_3	H	4-$OCH(CH_3)COOC_4H_9$-t	4-F	O	n_D^{20} 1.5300
384	CH_3	CH_3	H	4-$OCH(CH_3)COOC_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5380
385	CH_3	CH_3	H	4-$OCH(C_3H_7\text{-i})COOC_2H_5$	H	O	n_D^{20} 1.5448
386	CH_3	CH_3	H	4-$OC(CH_3)_2COOC_2H_5$	H	O	n_D^{20} 1.5553
387	CH_3	CH_3	H	4-$OC(CH_3)_2COOC_3H_7$-i	H	O	n_D^{20} 1.5522
388	CH_3	CH_3	H	4-OCH_2-C$_6$H$_5$	H	O	n_D^{20} 1.5565
389	CH_3	CH_3	H	4-$OSi(CH_3)_2C_4H_9$-t	H	O	n_D^{20} 1.5423

- Cont'd -

Table 1(a) (Cont'd)

390	CH_3	CH_3	H	4-SCH_3	H	O	m.p. 81.8
391	CH_3	CH_3	H	4-SCH_3	4-F	O	n_D^{20} 1.5930
392	CH_3	CH_3	H	4-SCH_3	4-Cl	O	n_D^{20} 1.5955
393	CH_3	CH_3	H	4-SCH_3	4-OCH_3	O	n_D^{20} 1.5995
394	CH_3	CH_3	H	4-$SOCH_3$	H	O	n_D^{20} 1.5865
395	CH_3	CH_3	H	4-$SOCH_3$	4-F	O	n_D^{20} 1.5700
396	CH_3	CH_3	H	4-$SOCH_3$	4-Cl	O	n_D^{20} 1.5908
397	CH_3	CH_3	H	4-$SOCH_3$	4-OCH_3	O	n_D^{20} 1.5864
398	CH_3	CH_3	H	4-SO_2CH_3	H	O	n_D^{20} 1.5745
399	CH_3	CH_3	H	4-SO_2CH_3	4-F	O	n_D^{20} 1.5658
400	CH_3	CH_3	H	4-SO_2CH_3	4-Cl	O	n_D^{20} 1.5672
401	CH_3	CH_3	H	4-SO_2CH_3	4-OCH_3	O	n_D^{20} 1.5866
402	CH_3	CH_3	H	4-SC_2H_5	H	O	n_D^{20} 1.6026
403	CH_3	CH_3	H	4-SC_2H_5	4-F	O	n_D^{20} 1.5940
404	CH_3	CH_3	H	4-SOC_2H_5	H	O	n_D^{20} 1.5899
405	CH_3	CH_3	H	4-SOC_2H_5	4-F	O	n_D^{20} 1.5740

- Cont'd -

Table 1(a) (Cont'd)

406	CH_3	CH_3	H	4-$SO_2C_2H_5$	H	O	m.p. 118.9
407	CH_3	CH_3	H	4-$SO_2C_2H_5$	4-F	O	n_D^{20} 1.5891
408	CH_3	CH_3	H	2-SC_3H_7-i, 5-CH_3	H	O	n_D^{20} 1.5830
409	CH_3	CH_3	H	4-SC_3H_7-i	H	O	n_D^{20} 1.5902
410	CH_3	CH_3	H	2-SC_3H_7-i	H	O	n_D^{20} 1.5872
411	CH_3	CH_3	H	4-SC_3H_7-i	4-F	O	n_D^{20} 1.5752
412	CH_3	CH_3	H	4-SC_3H_7-i	4-Cl	O	n_D^{20} 1.5928
413	CH_3	CH_3	H	4-SC_3H_7-i	4-OCH_3	O	n_D^{20} 1.5862
414	CH_3	CH_3	H	4-SOC_3H_7-i	H	O	n_D^{20} 1.5802
415	CH_3	CH_3	H	4-SOC_3H_7-i	4-F	O	n_D^{20} 1.5669
416	CH_3	CH_3	H	4-SOC_3H_7-i	4-Cl	O	n_D^{20} 1.5810
417	CH_3	CH_3	H	4-SOC_3H_7-i	4-OCH_3	O	n_D^{20} 1.5748
418	CH_3	CH_3	H	4-$SO_2C_3H_7$-i	H	O	n_D^{20} 1.5626
419	CH_3	CH_3	H	4-$SO_2C_3H_7$-i	4-F	O	n_D^{20} 1.5594
420	CH_3	CH_3	H	4-$SO_2C_3H_7$-i	4-OCH_3	O	n_D^{20} 1.5652

- Cont'd -

Table 1(a) (Cont'd)

421	CH_3	CH_3	H	4-SC_4H_9-t	H	O	n_D^{20} 1.5853
422	CH_3	CH_3	H	4-$SCHF_2$	H	O	n_D^{20} 1.5733
423	CH_3	CH_3	H	4-$SCHF_2$	H	S	n_D^{20} 1.6056
424	CH_3	CH_3	CH_3	4-$SCHF_2$	H	O	n_D^{20} 1.5482
425	C_2H_5	CH_3	H	4-$SCHF_2$	H	O	n_D^{20} 1.5659
426	CH_3	CH_3		4-$SCHF_2$	H	O	n_D^{20} 1.5917
427	CH_3	CH_3	H	4-$SCHF_2$	2-CH_3	O	n_D^{20} 1.5715
428	CH_3	CH_3	H	4-$SCHF_2$	3-CH_3	O	n_D^{20} 1.5741
429	CH_3	CH_3	H	4-$SCHF_2$	4-CH_3	O	n_D^{20} 1.5780
430	CH_3	CH_3	H	4-$SCHF_2$	4-C_4H_9-t	O	n_D^{20} 1.5569
431	CH_3	CH_3	H	4-$SCHF_2$	4-F	O	n_D^{20} 1.5679
432	CH_3	CH_3	H	4-$SCHF_2$	2-Cl	O	n_D^{20} 1.5750
433	CH_3	CH_3	H	4-$SCHF_2$	3-Cl	O	n_D^{20} 1.5721
434	CH_3	CH_3	H	4-$SCHF_2$	4-Cl	O	n_D^{20} 1.5395
435	CH_3	CH_3	H	4-$SCHF_2$	3,4-Cl_2	O	n_D^{20} 1.5852

- Cont'd -

Table 1(a) (Cont'd)

436	CH_3	CH_3	H	4-$SCHF_2$	4-Br	O	n_D^{20} 1.5855
437	CH3	CH_3	H	4-$SCHF_2$	4-OCH_3	O	n_D^{20} 1.5694
438	CH_3	CH_3	H	4-$SOCHF_2$	H	O	n_D^{20} 1.5575
439	CH_3	CH_3	H	4-$SOCHF_2$	4-F	O	Paste
440	CH_3	CH_3	H	4-$SOCHF_2$	4-Cl	O	n_D^{20} 1.5748
441	CH_3	CH_3	H	4-$SOCHF_2$	4-Br	O	n_D^{20} 1.5768
442	CH_3	CH_3	H	4-$SOCHF_2$	4-OCH_3	O	n_D^{20} 1.5704
443	CH_3	CH_3	H	4-SO_2CHF_2	H	O	n_D^{20} 1.5765
444	CH_3	CH_3	H	4-SO_2CHF_2	4-F	O	n_D^{20} 1.5500
445	CH_3	CH_3	H	4-SO_2CHF_2	4-Cl	O	n_D^{20} 1.5612
446	CH_3	CH_3	H	4-SO_2CHF_2	4-Br	O	n_D^{20} 1.5643
447	CH_3	CH_3	H	4-SO_2CHF_2	4-OCH_3	O	n_D^{20} 1.5597
448	CH_3	CH_3	H	4-SCF_2Br	H	O	n_D^{20} 1.5801
449	CH_3	CH_3	H	4-SCF_2Br	4-F	O	m.p. 82.3
450	CH_3	CH_3	H	4-SCF_2CFCl_2	H	O	n_D^{20} 1.5557

- Cont'd -

Table 1(a) (Cont'd)

451	CH_3	CH_3	H	4-SCF_2CFCl_2	4-F	O	n_D^{20} 1.5557
452	CH_3	CH_3	H	4-SCF_2CFCl_2	4-Cl	O	n_D^{20} 1.5676
453	CH_3	CH_3	H	4-SCF_2CFCl_2	4-OCH_3	O	n_D^{20} 1.5640
454	CH_3	CH_3	H	4-$SOCF_2CFCl_2$	H	O	n_D^{20} 1.5889
455	CH_3	CH_3	H	4-$SO_2CF_2CFCl_2$	H	O	n_D^{20} 1.5958
456	CH_3	CH_3	H	4-SCH_2CF_3	H	O	n_D^{20} 1.5722
457	CH_3	CH_3	H	4-SCH_2CF_3	4-F	O	n_D^{20} 1.5569
458	CH_3	CH_3	H	4-SCH_2CF_3	4-Cl	O	n_D^{20} 1.5732
459	CH_3	CH_3	H	4-SCH_2CF_3	4-OCH_3	O	n_D^{20} 1.5568
460	CH_3	CH_3	H	4-$SOCH_2CF_3$	4-F	O	n_D^{20} 1.5501
461	CH_3	CH_3	H	4-$SOCH_2CF_3$	4-Cl	O	n_D^{20} 1.5620
462	CH_3	CH_3	H	4-$SOCH_2CF_3$	4-OCH_3	O	n_D^{20} 1.5518
463	CH_3	CH_3	H	4-$SO_2CH_2CF_3$	4-F	O	n_D^{20} 1.5449
464	CH_3	CH_3	H	4-$SO_2CH_2CF_3$	4-Cl	O	n_D^{20} 1.5497
465	CH_3	CH_3	H	4-SCF_2CHF_2	H	O	n_D^{20} 1.5527

- Cont'd -

Table 1(a) (Cont'd)

466	CH_3	CH_3	CH_3	4-SCF_2CHF_2	H	O	n_D^{20} 1.5514
467	CH_3	CH_3	H	4-SCF_2CHF_2	2-F	O	n_D^{20} 1.5462
468	CH_3	CH_3	H	4-SCF_2CHF_2	3-F	O	n_D^{20} 1.5450
469	CH_3	CH_3	H	4-SCF_2CHF_2	4-F	O	n_D^{20} 1.5536
470	CH_3	CH_3	H	4-SCF_2CHF_2	2-Cl	O	n_D^{20} 1.5540
471	CH_3	CH_3	H	4-SCF_2CHF_2	4-Cl	O	n_D^{20} 1.5636
472	CH_3	CH_3	H	4-SCF_2CHF_2	2-OCH_3	O	n_D^{20} 1.5547
473	CH_3	CH_3	H	4-SCF_2CHF_2	3-OCH_3	O	n_D^{20} 1.5541
474	CH_3	CH_3	H	4-SCF_2CHF_2	4-OCH_3	O	n_D^{20} 1.5645
475	CH_3	CH_3	H	4-SCF_2CHF_2	3,5-$(OCH_3)_2$	O	n_D^{20} 1.5477
476	CH_3	CH_3	H	4-$SOCF_2CHF_2$	H	O	n_D^{20} 1.5865
477	CH_3	CH_3	H	4-$SOCF_2CHF_2$	4-F	O	n_D^{20} 1.5684
478	CH_3	CH_3	H	4-$SOCF_2CHF_2$	4-Cl	O	n_D^{20} 1.5498
479	CH_3	CH_3	H	4-$SOCF_2CHF_2$	4-OCH_3	O	n_D^{20} 1.5786
480	CH_3	CH_3	H	4-$SO_2CF_2CHF_2$	4-F	O	Paste

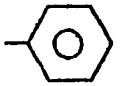
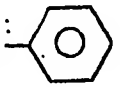
- Cont'd -

Table 1(a) (Cont'd)

481	CH_3	CH_3	H	4-$SO_2CF_2CHF_2$	H	O	Paste
482	CH_3	CH_3	H	4-$SO_2CF_2CHF_2$	4-Cl	O	n_D^{20} 1.5420
483	CH_3	CH_3	H	4-$SO_2CF_2CHF_2$	4-OCH_3	O	n_D^{20} 1.5890
484	CH_3	CH_3	H	4-SCF_2CF_2Br	H	O	n_D^{20} 1.5632
485	CH_3	CH_3	H	4-SCF_2CF_2Br	4-F	O	n_D^{20} 1.5585
486	CH_3	CH_3	H	4-SCF_2CF_2Br	4-Cl	O	n_D^{20} 1.5655
487	CH_3	CH_3	H	4-SCF_2CF_2Br	4-OCH_3	O	n_D^{20} 1.5622
488	CH_3	CH_3	H	4-$SOCF_2CF_2Br$	H	O	n_D^{20} 1.5680
489	CH_3	CH_3	H	4-$SOCF_2CF_2Br$	4-F	O	n_D^{20} 1.5503
490	CH_3	CH_3	H	4-$SO_2CF_2CF_2Br$	4-F	O	n_D^{20} 1.5686
491	CH_3	CH_3	H	4-$SOCF_2CF_2Br$	4-Cl	O	n_D^{20} 1.5611
492	CH_3	CH_3	H	4-$SOCF_2CF_2Br$	4-OCH_3	O	n_D^{20} 1.5588
493	CH_3	CH_3	H	4-SC_3F_7	H	O	n_D^{20} 1.5250
494	CH_3	CH_3	CH_3	4-SC_3F_7	H	O	n_D^{20} 1.5217
495	CH_3	CH_3	H	4-SC_3F_7	4-CH_3	O	n_D^{20} 1.5228

- Cont'd -

Table 1(a) (Cont'd)

496	CH_3	CH_3	H	4-SC_3F_7	3-F	O	n_D^{20} 1.5172
497	CH_3	CH_3	H	4-SC_3F_7	4-F	O	n_D^{20} 1.5175
498	CH_3	CH_3	H	4-SC_3F_7	3-Cl	O	n_D^{20} 1.5298
499	CH_3	CH_3	H	4-SC_3F_7	4-Cl	O	Paste
500	CH_3	CH_3	H	4-SC_3F_7	3-CF_3	O	n_D^{20} 1.5020
501	CH_3	CH_3	H	4-SC_3F_7	3-OCH_3	O	n_D^{20} 1.5263
502	CH_3	CH_3	H	4-SC_3F_7	4-OCH_3	O	n_D^{20} 1.5137
503	CH_3	CH_3	H	4-SOC_3F_7	H	O	n_D^{20} 1.5289
504	CH_3	CH_3	H	4-SOC_3F_7	4-F	O	Paste
505	CH_3	CH_3	H	4-SOC_3F_7	4-F	O	Paste
506	CH_3	CH_3	H	4-S- 	H	O	n_D^{20} 1.6134
507	CH_3	CH_3	H	4-SO- 	H	O	n_D^{20} 1.5980
508	CH_3	CH_3	H	4-SO_2- 	H	O	n_D^{20} 1.5940
509	CH_3	CH_3	H	4-Cl	4-Cl	O	n_D^{20} 1.6052

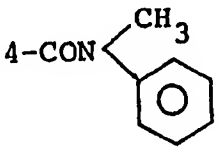
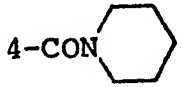
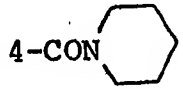
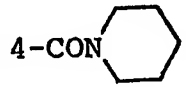
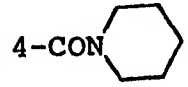
- Cont'd -

Table 1(a) (Cont'd)

510	CH_3	CH_3	H	4-$SOCHF_2$	4-Cl	O	n_D^{20} 1.5643
511	CH_3	CH_3	H	4-SCF_3	H	O	n_D^{20} 1.5320
512	CH_3	CH_3	H	4-$SOCF_3$	H	O	n_D^{20} 1.5324
513	CH_3	CH_3	H	4-SO_2CF_3	H	O	n_D^{20} 1.5876
514	CH_3	CH_3	H	4-SC_3F_7	4-$OCHF_2$	O	n_D^{20} 1.5235
515	CH_3	CH_3	H	4-SC_3F_7	4-OCF_3	O	n_D^{20} 1.5201
516	CH_3	CH_3	H	4-$COSC_2H_5$	H	O	n_D^{20} 1.5889
517	CH_3	CH_3	H	4-$COSC_3H_7$-i	H	O	n_D^{20} 1.5812
518	CH_3	CH_3	H	4-$COSC_4H_9$-t	H	O	n_D^{20} 1.5896
519	CH_3	CH_3	H	4-$CONHCH_3$	H	O	Crystal
520	CH_3	CH_3	H	4-$CONHCH_3$	4-F	O	n_D^{20} 1.5576
521	CH_3	CH_3	H	4-$CONHC_3H_7$-i	H	O	m.p. 94.4
522	CH_3	CH_3	H	4-$CONHC_3H_7$-i	4-F	O	m.p. 136.4
523	CH_3	CH_3	H	4-$CONHC_4H_9$-t	H	O	m.p. 106.7
524	CH_3	CH_3	H	4-$CONHC_4H_9$-t	4-F	O	n_D^{20} 1.5582

- Cont'd -

Table 1(a) (Cont'd)

525	CH_3	CH_3	H	4-$CONHC_4H_9$-t	4-OCH_3	O	n_D^{20} 1.5662
526	CH_3	CH_3	H	4-$CON(CH_3)_2$	H	O	n_D^{20} 1.5808
527	CH_3	CH_3	H	4-$CON(C_3H_7\text{-i})_2$	H	O	n_D^{20} 1.5263
528	CH_3	CH_3	H	4-$CON(C_3H_7\text{-i})_2$	4-F	O	n_D^{20} 1.5245
529	CH_3	CH_3	H	4-$CON(C_3H_7\text{-i})_2$	4-Cl	O	n_D^{20} 1.5326
530	CH_3	CH_3	H	4-$CON(C_3H_7\text{-i})_2$	4-OCH_3	O	n_D^{20} 1.5328
531	CH_3	CH_3	H		H	O	n_D^{20} 1.5803
532	CH_3	CH_3	H		H	O	n_D^{20} 1.5689
533	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5755
534	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5657
535	CH_3	CH_3	H		4-OCH_3	O	Paste

- Cont'd -

Table 1(a) (Cont'd)

536	CH_3	CH_3	H	4-CON⟨O⟩	H	O	n_D^{20} 1.5632
537	CH_3	CH_3	H	4-CON⟨O⟩	4-F	O	n_D^{20} 1.5600
538	CH_3	CH_3	H	4-CON⟨O⟩	$4-OCH_3$	O	n_D^{20} 1.5498
539	CH_3	CH_3	H	4-CON⟨O⟩ (2,6-di-CH_3)	H	O	n_D^{20} 1.5617
540	CH_3	CH_3	H	4-CON⟨O⟩ (2,6-di-CH_3)	4-F	O	n 1.5643
541	CH_3	CH_3	H	$4-COCH_3$	H	O	m.p. 88.0
542	CH_3	CH_3	H	$4-COCOOC_2H_5$	H	O	n_D^{20} 1.5709
543	CH_3	CH_3	H	$4-COCOOC_3H_7$-i	H	O	n_D^{20} 1.5756
544	CH_3	CH_3	H	$4-COC_2H_5$	H	O	m.p. 59.0
545	CH_3	CH_3	H	$4-COC_2H_5$	4-F	O	n_D^{20} 1.5664

- Cont'd -

Table 1(a) (Cont'd)

546	CH_3	CH_3	H	4-COC_3H_7-i	H	O	n_D^{20} 1.5705
547	CH_3	CH_3	H	4-COC_4H_9-t	H	O	n_D^{20} 1.5853
548	CH_3	CH_3	H	4-COC_4H_9-t	4-F	O	n_D^{20} 1.5567
549	CH_3	CH_3	H	4-COC_4H_9-t	4-Cl	O	n_D^{20} 1.5896
550	CH_3	CH_3	H	4-CO-C(CH_3)$_2$-CN	H	O	n_D^{20} 1.5865
551	CH_3	CH_3	H	4-COC(CH_3)$_2$-$COOCH_3$	H	O	n_D^{20} 1.5630
552	CH_3	CH_3	H	4-CO-C_6H_5	H	O	n_D^{20} 1.5941
553	CH_3	CH_3	H	4-CO-C_6H_5	4-Cl	O	n_D^{20} 1.5850
554	CH_3	CH_3	H	4-CO-C_6H_4-Cl	H	O	n_D^{20} 1.5952

- Cont'd -

Table 1(a) (Cont'd)

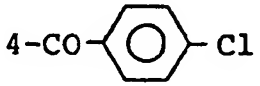
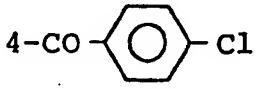
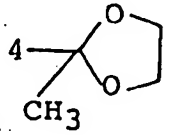
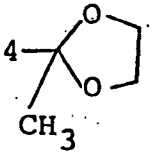
555	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5935
556	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5967
557	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5937
558	CH_3	CH_3	H		H	O	n_D^{20} 1.5764
559	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5643
560	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5830
561	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5782
562	CH_3	CH_3	H		H	O	n_D^{20} 1.5698
563	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5555

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Table 1(a) (Cont'd)

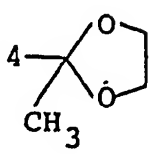
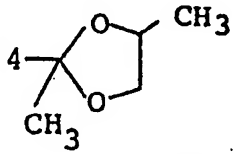
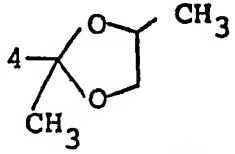
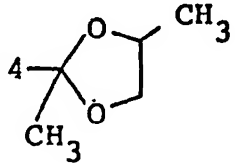
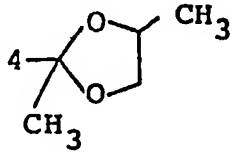
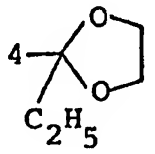
564	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5569
565	CH_3	CH_3	H		H	O	n_D^{20} 1.5619
566	CH_3	CH_3	H		4-F	O	Paste
567	CH_3	CH_3	H		4-Cl	O	n_D^{20} 1.5689
568	CH_3	CH_3	H		$4-OCH_3$	O	n_D^{20} 1.5593
569	CH_3	CH_3	H		H	O	n_D^{20} 1.5630

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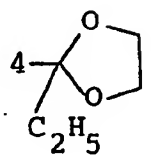
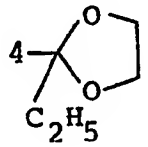
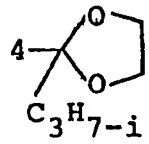
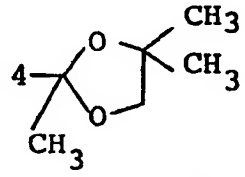
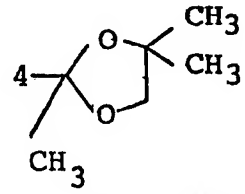
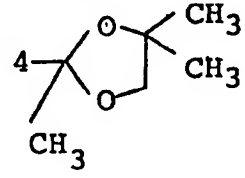
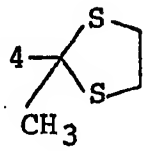
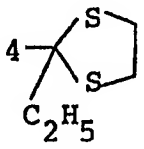
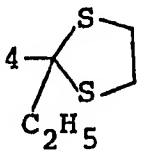
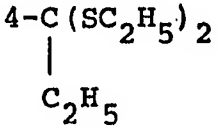
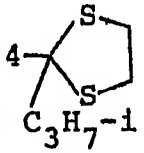
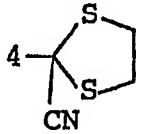
Table 1(a) (Cont'd)

570	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5472
571	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5623
572	CH_3	CH_3	H		H	O	n_D^{20} 1.5560
573	CH_3	CH_3	H		H	O	n_D^{20} 1.5526
574	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5656
575	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5123

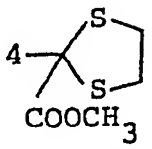
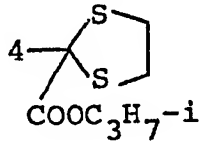
- Cont'd -

Table 1(a) (Cont'd)

576	CH_3	CH_3	H		H	O	n_D^{20} 1.6188
577	CH_3	CH_3	H		H	O	n_D^{20} 1.6089
578	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5978
579	CH_3	CH_3	H		H	O	n_D^{20} 1.5831
580	CH_3	CH_3	H		H	O	n_D^{20} 1.5952
581	CH_3	CH_3	H		H	O	Paste

- Cont'd -

Table 1(a) (Cont'd)

582	CH_3	CH_3	H		H	O	n_D^{20} 1.5665
583	CH_3	CH_3	H		H	O	n_D^{20} 1.5685
584	CH_3	CH_3	H	4-$CHCH_3$ (OH)	H	O	n_D^{20} 1.5748
585	CH_3	CH_3	H	4-$CHCH_3$ ($OCOCH_3$)	H	O	n_D^{20} 1.5623
586	CH_3	CH_3	H	4-$C(CH_3)_2$ (OH)	H	O	n_D^{20} 1.5682
587	CH_3	CH_3	H	4-CHC_2H_5 (OH)	H	O	n_D^{20} 1.5768
588	CH_3	CH_3	H	4-C(C_2H_5)(C_4H_9-n)(OH)	H	O	n_D^{20} 1.5620

- Cont'd -

Table 1(a) (Cont'd)

589	CH_3	CH_3	H	4-N(H)CHO	H	O	m.p. 105.3
590	CH_3	CH_3	H	4-N(H)$COOCH_3$	H	O	n_D^{20} 1.5808
591	CH_3	CH_3	H	4-N(H)$COOCH_2CH_2OCH_3$	H	O	n_D^{20} 1.5705
592	CH_3	CH_3	H	4-N(H)$COOCH_2CH_2OCH_3$	4-F	O	n_D^{20} 1.5621
593	CH_3	CH_3	H	4-N(H)$COOCH_2CH_2OCH_3$	4-OCH_3	O	n_D^{20} 1.5659
594	CH_3	CH_3	H	4-N(H)$COOC_3H_7$-i	H	O	m.p. 115.2
595	CH_3	CH_3	H	4-N(H)$COOC_3H_7$-i	4-F	O	n_D^{20} 1.5645
596	CH_3	CH_3	H	2-N(CH_3)$COOCH_3$	H	O	Paste

- Cont'd -

Table 1(a) (Cont'd)

597	CH_3	CH_3	H	2-N(CH_3)CH_2COOCH_3	4-F	O	n_D^{20} 1.5561
598	CH_3	CH_3	H	2-N(CH_3)CH_2COOCH_3	4-OCH_3	O	n_D^{20} 1.5599
599	CH_3	CH_3	H	3-N(CH_3)CH_2COOCH_3	H	O	n_D^{20} 1.5764
600	CH_3	CH_3	H	3-N(CH_3)CH_2COOCH_3	4-F	O	n_D^{20} 1.5685
601	CH_3	CH_3	H	3-N(CH_3)CH_2COOCH_3	4-OCH_3	O	n_D^{20} 1.5723
602	CH_3	CH_3	H	4-N(CH_3)CH_2COOCH_3	H	O	Paste
603	CH_3	CH_3	H	4-N(CH_3)CH_2COOCH_3	4-F	O	Paste
604	CH_3	CH_3	H	4-N(CH_3)$CH_2COOCH_2CH_2OCH_3$	H	O	n_D^{20} 1.5683

- Cont'd -

Table 1(a) (Cont'd)

605	CH_3	CH_3	H	3-N(CH_3)($COOC_3H_7$-n)	H	O	n_D^{20} 1.5662
606	CH_3	CH_3	H	3-N(CH_3)($COOC_3H_7$-n)	4-F	O	n_D^{20} 1.5582
607	CH_3	CH_3	H	3-N(CH_3)($COOC_3H_7$-n)	4-OCH_3	O	n_D^{20} 1.5625
608	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-n)	H	O	n_D^{20} 1.5564
609	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-n)	4-F	O	n_D^{20} 1.5559
610	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-n)	4-Cl	O	n_D^{20} 1.5595
611	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-n)	4-OCH_3	O	n_D^{20} 1.5557
612	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-i)	H	O	n_D^{20} 1.5648

- Cont'd -

Table 1(a) (Cont'd)

613	CH_3	CH_3	H	4-N(CH_3)($COOC_3H_7$-i)	4-F	O	n_D^{20} 1.5529
614	CH_3	CH_3	H	4-N(CH_3)($COOC_4H_9$-i)	H	O	n_D^{20} 1.5582
615	CH_3	CH_3	H	4-N(CH_3)($COOC_4H_9$-i)	4-F	O	n_D^{20} 1.5421
616	CH_3	CH_3	H	4-N(CH_3)($COOC_4H_9$-i)	4-Cl	O	n_D^{20} 1.5573
617	CH_3	CH_3	H	4-N(CH_3)($COOC_4H_9$-i)	4-OCH_3	O	n_D^{20} 1.5538
618	CH_3	CH_3	H	4-N(CH_3)($COOC_4H_9$-i)	3,4(-OCH_2O-)	O	n_D^{20} 1.5621
619	CH_3	CH_3	H	4-N(C_2H_5)($COOCH_3$)	H	O	n_D^{20} 1.5638
620	CH_3	CH_3	H	4-N(C_2H_5)($COOCH_3$)	4-F	O	Paste

- Cont'd -

Table 1(a) (Cont'd)

621	CH_3	CH_3	H	4-N(C_2H_5)CH_2COOCH_3	4-OCH_3	O	n_D^{20} 1.5656
622	CH_3	CH_3	CH_3	4-N(C_2H_5)CH_2COOCH_3	H	O	m.p. 83.4
623	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOCH_2CH_2Cl$	H	O	n_D^{20} 1.5706
624	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOCH_2CH_2Cl$	4-F	O	Paste
625	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOCH_2CH_2Cl$	4-OCH_3	O	n_D^{20} 1.5695
626	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOC_3H_7$-n	H	O	n_D^{20} 1.5605
627	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOC_3H_7$-n	4-F	O	n_D^{20} 1.5532
628	CH_3	CH_3	H	4-N(C_2H_5)$CH_2COOC_3H_7$-n	4-OCH_3	O	n_D^{20} 1.5602

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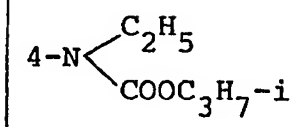
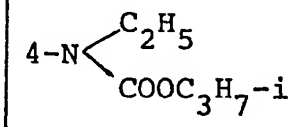
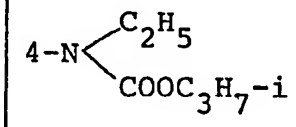
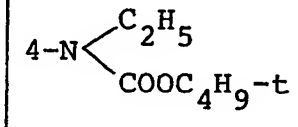
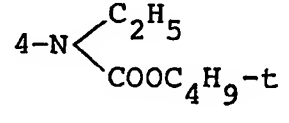
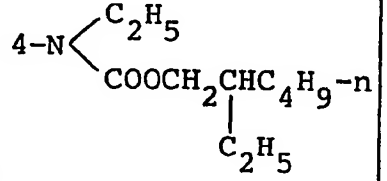
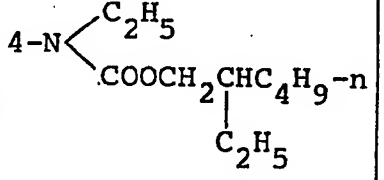
Table 1(a) (Cont'd)

629	CH_3	CH_3	H		H	O	n_D^{20} 1.5549
630	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5448
631	CH_3	CH_3	H		$4-OCH_3$	O	n_D^{20} 1.5513
632	CH_3	CH_3	H		H	O	n_D^{20} 1.5689
633	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5701
634	CH_3	CH_3	H		H	O	n_D^{20} 1.5481
635	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5415

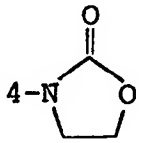
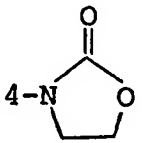
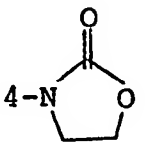
- Cont'd -

Table 1(a) (Cont'd)

636	CH_3	CH_3	H	4-N(C_3H_7-i)(CHO)	H	O	m.p. 73.3
637	CH_3	CH_3	H	4-N(C_3H_7-i)(CHO)	4-F	O	n_D^{20} 1.5685
638	CH_3	CH_3	H	4-N(C_3H_7-i)(CHO)	4-OCH_3	O	n_D^{20} 1.5710
639	CH_3	CH_3	H	4-N(C_3H_7-i)($COOCH_3$)	H	O	n_D^{20} 1.5520
640	CH_3	CH_3	H	4-N(C_3H_7-i)($COOCH_3$)	4-F	O	Paste
641	CH_3	CH_3	H	4-N(C_3H_7-i)($COOCH_3$)	4-OCH_3	O	n_D^{20} 1.5610
642	CH_3	CH_3	H	4-N(C_3H_7-i)($COOC_3H_7$-n)	H	O	n_D^{20} 1.5516
643	CH_3	CH_3	H	4-N(C_3H_7-i)($COOC_3H_7$-n)	4-F	O	n_D^{20} 1.5489

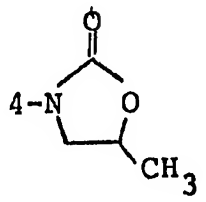
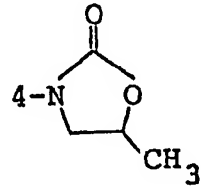
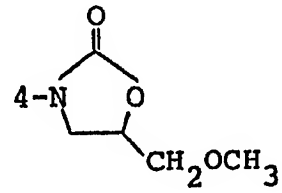
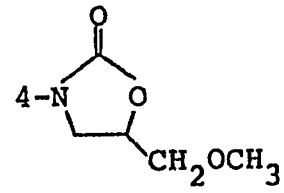
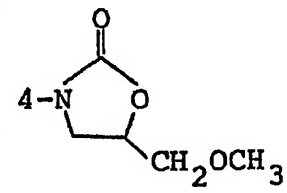
- Cont'd -

Table 1(a) (Cont'd)

644	CH_3	CH_3	H	4-N(C_3H_7-i)($COOC_3H_7$-n)	4-OCH_3	O	n_D^{20} 1.5542
645	CH_3	CH_3	H	4-N(C_3H_7-i)($COOC_3H_7$-i)	H	O	n_D^{20} 1.5545
646	CH_3	CH_3	H	4-N(C_3H_7-i)($COOC_3H_7$-i)	4-F	O	n_D^{20} 1.5448
647	CH_3	CH_3	H	4-N(C_2H_5)(COC_4H_9-t)	H	O	Paste
648	CH_3	CH_3	H		H	O	m.p. 85.0
649	CH_3	CH_3	H		4-F	O	Paste
650	CH_3	CH_3	H		4-OCH_3	O	n_D^{20} 1.5861

- Cont'd -

Table 1(a) (Cont'd)

651	CH_3	CH_3	H		H	O	m.p. 115.1
652	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5718
653	CH_3	CH_3	H		H	O	n_D^{20} 1.5730
654	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5551
655	CH_3	CH_3	H		$4-OCH_3$	O	n_D^{20} 1.5660

- Cont'd -

Table 1(a).(Cont'd)

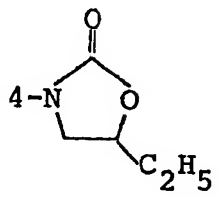
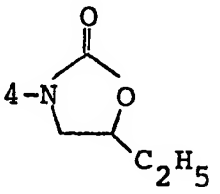
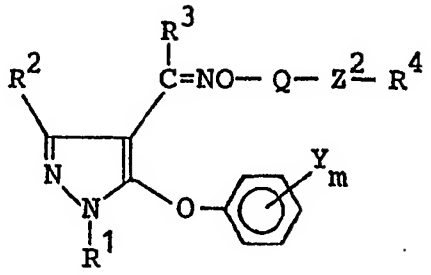
656	CH_3	CH_3	H		H	O	n_D^{20} 1.5718
657	CH_3	CH_3	H		4-F	O	n_D^{20} 1.5601

Table I(b)



(Ic)

This formula corresponds to the general formula (I) wherein Z^1 is an oxygen atom.

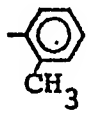
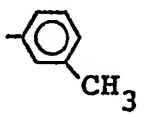
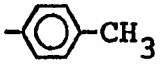
Compound No.	R^1	R^2	R^3	Q	Z^2	R^4	Y_m	Physical property m.p.(°C) or refractive index
658	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5657
659	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5760
660	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5683
661	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5704

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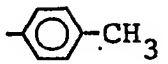
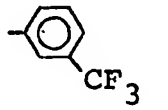
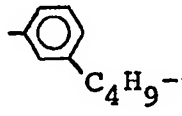
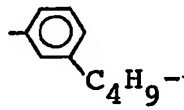
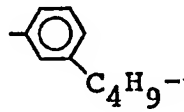
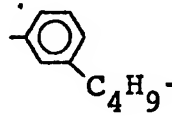
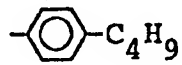
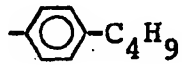
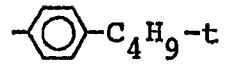
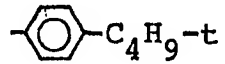
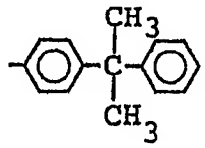
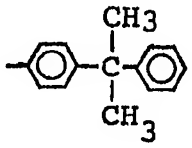
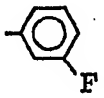
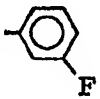
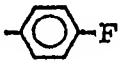
Table 1(b) (Cont'd)

662	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	n_D^{20} 1.5524
663	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 63.4
664	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5592
665	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5641
666	CH_3	CH_3	H	$-CH_2CH_2-$	O		3-Cl	n_D^{20} 1.5669
667	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5606
668	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5509
669	CH_3	CH_3	H	$-CH_2CH_2-$	O		$3-OCH_3$	n_D^{20} 1.5459

- Cont'd -

Table 1(b) (Cont'd)

670	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-OCH_3	m.p. 59.6
671	CH_3	CH_3	H	$-CH_2CH_2-$	O		3-CF_3	n_D^{20} 1.5287
672	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5612
673	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5741
674	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5618
675	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5657
676	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	m.p. 100.2
677	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5552

- Cont'd -

Table 1(b) (Cont'd)

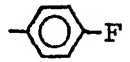
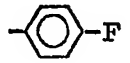
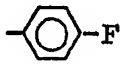
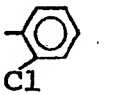
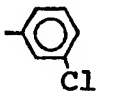
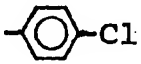
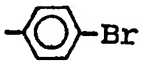
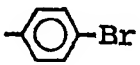
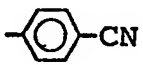
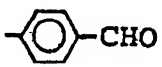
678	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5738
679	CH_3	CH_3	H	$-CH_2CH_2-$	O		3-Cl	n_D^{20} 1.5730
680	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5681
681	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 51.2
682	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5722
683	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5795
684	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5936
685	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	m.p. 101.5
686	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 86.1
687	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5833

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Table 1(b) (Cont'd)

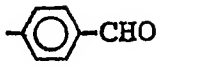
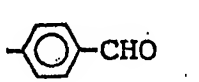
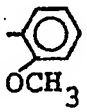
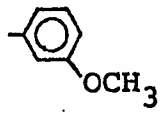
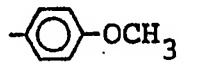
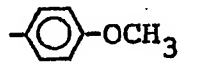
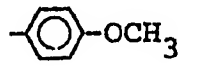
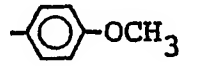
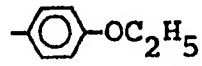
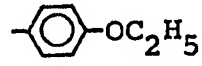
688	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	m.p. 87.7
689	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5777
690	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 58.6
691	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5769
692	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5583
693	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	m.p. 90.3
694	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	n_D^{20} 1.5565
695	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	m.p. 81.5
696	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5682
697	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	m.p. 53.0

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Table 1(b) (Cont'd)

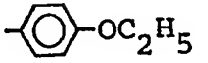
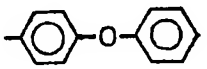
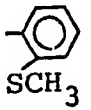
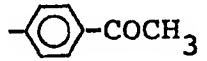
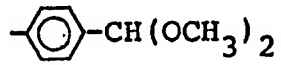
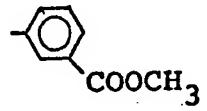
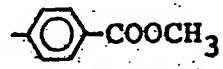
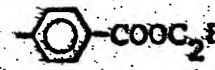
698	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-OCH_3	m.p. 103.6
699	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5800
700	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5901
701	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5835
702	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5742
703	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5851
704	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 60.6
705	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 60.5
706	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5577
707	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5579

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Table 1(b) (Cont'd)

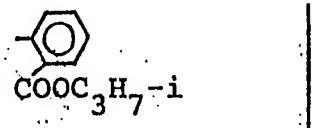
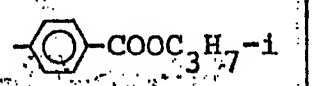
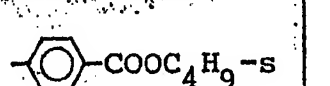
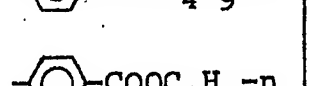
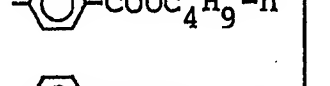
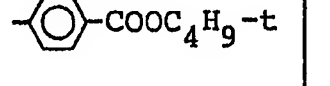
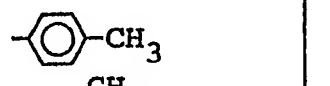
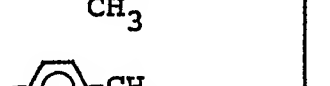
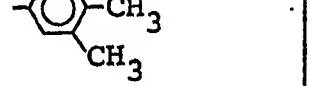
708	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5581
709	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5632
710	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5577
711	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5555
712	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5490
713	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5616
714	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	m.p. 92.5
715	CH_3	CH_3	H	$-CH_2CH_2-$	O		3-Cl	n_D^{20} 1.5701
716	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-OCH_3	n_D^{20} 1.5598

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table 1(b) (Cont'd)

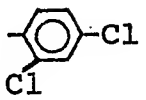
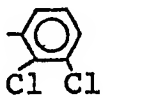
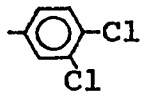
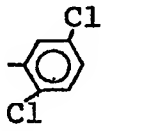
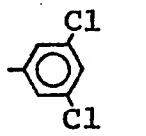
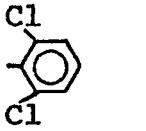
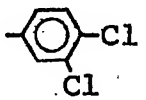
717	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5813
718	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5838
719	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5846
720	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 80.3
721	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5862
722	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5816
723	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5756

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Table 1(b) (Cont'd)

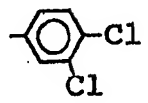
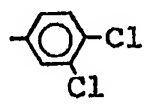
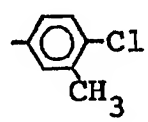
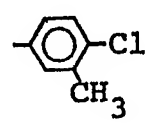
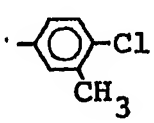
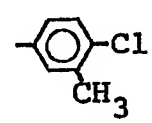
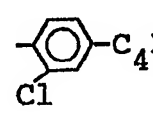
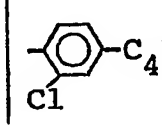
724	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-OCH_3	n_D^{20} 1.5798
725	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	m.p. 72.2
726	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 73.8
727	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5694
728	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-OCH_3	n_D^{20} 1.5665
729	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	n_D^{20} 1.5588
730	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5677
731	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5650

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Table 1(b) (Cont'd)

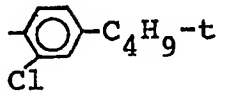
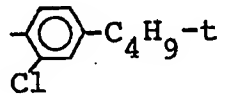
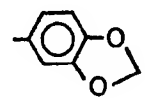
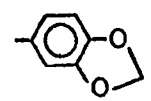
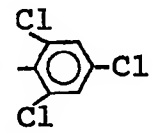
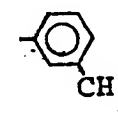
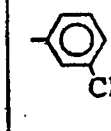
732	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	n_D^{20} 1.5552
733	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5657
734	CH_3	CH_3	H	$-CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5682
735	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-F	n_D^{20} 1.5612
736	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5737
737	CH_3	C_2H_5	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5626
738	CH_3	C_3H_7-i	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5571

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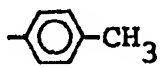
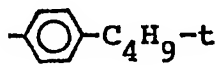
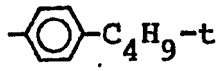
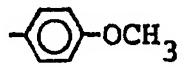
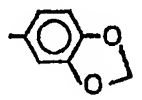
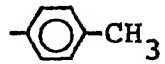
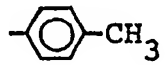
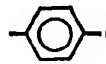
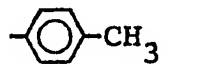
Table 1(b) (Cont'd)

739	CH_3	CH_3	CH_3	$-CH_2CH_2-$	O		H	n_D^{20} 1.5530
740	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		H	n_D^{20} 1.5530
741	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		4-F	n_D^{20} 1.5484
742	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		H	n_D^{20} 1.5520
743	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		H	n_D^{20} 1.5405
744	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		4-F	n_D^{20} 1.5368
745	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		H	n_D^{20} 1.5482
746	CH_3	CH_3	H	$-CH_2\underset{\underset{CH_3}{\vert}}{CH}-$	O		H	n_D^{20} 1.5693

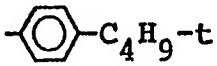
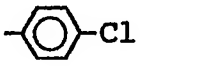
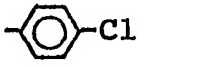
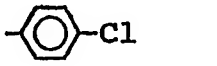
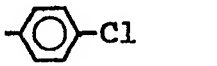
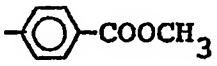
- Cont'd -

Table 1(b) (Cont'd)

747	CH_3	CH_3	H	$-CH_2CH(C_3H_7\text{-}i)-$	O		H	n_D^{20} 1.5453
748	CH_3	CH_3	H	$-CH_2CH(C_3H_7\text{-}i)-$	O		4-F	n_D^{20} 1.5418
749	CH_3	CH_3	H	$-CH_2CH(C_3H_7\text{-}i)-$	O		4-Cl	n_D^{20} 1.5613
750	CH_3	CH_3	H	$-CH_2CH(C_3H_7\text{-}i)-$	O		$4\text{-}OCH_3$	n_D^{20} 1.5440
751	CH_3	CH_3	H	$-CH_2CH_2-$	S		H	n_D^{20} 1.5594
752	CH_3	CH_3	H	$-CH_2CH_2-$	S		H	n_D^{20} 1.5902
753	CH_3	CH_3	H	$-CH_2CH_2-$	S		H	n_D^{10} 1.5775
754	Ch_3	CH_3	H	$-CH_2CH_2-$	S		H	m.p. 87.4
755	CH_3	CH_3	H	$-CH_2CH_2-$	S		H	m.p. 96.4

- Cont'd -

Table 1(b) (Cont'd)

756	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5647
757	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		4-F	n_D^{20} 1.5593
758	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5766
759	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5700
760	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5520
761	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5746
762	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5764
763	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		4-F	n_D^{20} 1.5648
764	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		$4-OCH_3$	n_D^{20} 1.5748
765	CH_3	CH_3	H	$-CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5689
766	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5670

- Cont'd -

Table 1(b) (Cont'd)

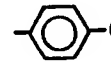
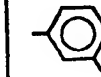
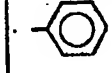
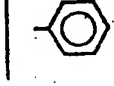
767	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		4-F	n_D^{20} 1.5553
768	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		4-Cl	n_D^{20} 1.5678
769	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		4-OCH_3	n_D^{20} 1.5605
770	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5620
771	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5511
772	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5672
773	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5653
774	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5638
775	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5763
776	CH_3	CH_3	H	$-CH_2CH=CHCH_2-$	O		H	n_D^{20} 1.5712
777	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5635

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Table 1(b) (Cont'd)

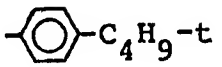
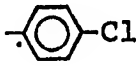
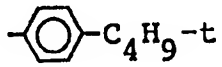
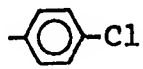
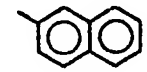
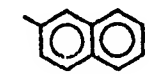
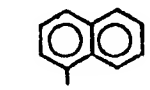
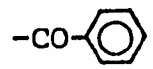
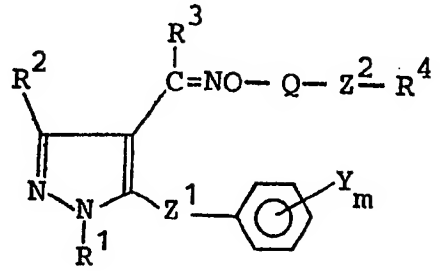
778	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{10} 1.5511
779	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5671
780	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5583
781	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5478
782	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2CH_2-$	O		H	n_D^{20} 1.5631
783	CH_3	CH_3	H	$-CH_2CH_2-$	O		4-Cl	m.p. 110.1
784	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	m.p. 107.4
785	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.6107
786	CH_3	CH_3	H	$-CH_2CH_2-$	O	$-COCH_3$	H	n_D^{20} 1.5411
787	CH_3	CH_3	H	$-CH_2CH_2-$	O		H	n_D^{20} 1.5632
788	CH_3	CH_3	H	$-CH_2CH_2-$	O	$-C_4H_9$-t	H	n_D^{20} 1.5273
789	CH_3	CH_3	H	$-CH_2CH_2-$	O	$-C_2H_5$	H	n_D^{20} 1.5407

Table I(c)



(I)

Compound No.	R^1	R^2	R^3	$-Q-Z^2-R^4$	Y_m	Physical property m.p. (°C) or refractive index
790	CH_3	CH_3	H	$-CH_3$	H	m.p. 70.2
791	CH_3	CH_3	H	$-C_2H_5$	H	n_D^{20} 1.5504
792	CH_3	CH_3	H	$-CH_2CH_2Br$	H	n_D^{20} 1.5721
793	CH_3	CH_3	H	$-C_3H_7$-i	H	n_D^{20} 1.5432
794	CH_3	CH_3	H	$-CH_2CH=CH_2$	H	n_D^{20} 1.5560
795	CH_3	CH_3	H	$-CH_2C\equiv CH$	4-Cl	n_D^{20} 1.5670
796	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2Br$	H	n_D^{20} 1.5618

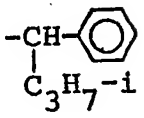
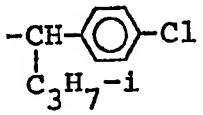
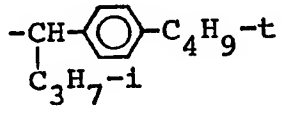
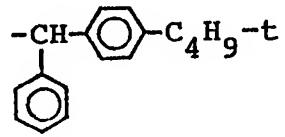
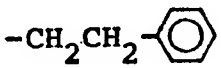
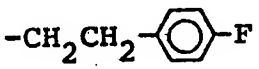
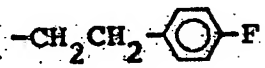
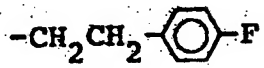
- Cont'd -

Table I(c) (Cont'd)

797	CH_3	CH_3	H	$-CH_2CH=C(CH_3)_2$	H	n_D^{20} 1.5494
798	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2Br$	H	n_D^{20} 1.5571
799	CH_3	CH_3	H	$-CH_2CH_2CH_2CH_2CH_2CH_2Br$	H	n_D^{20} 1.5522
800	CH_3	CH_3	H	$-CH_2CH=\overset{CH_3}{\overset{\vert}{C}}CH_2CH_2CH=C(CH_3)_2$	H	n_D^{20} 1.5267
801	CH_3	CH_3	H	$-CH_2CH=\overset{CH_3}{\overset{\vert}{C}}CH_2CH_2CH=C(CH_3)_2$	4-F	n_D^{20} 1.5294
802	CH_3	CH_3	H	$-CH_2CH=\overset{CH_3}{\overset{\vert}{C}}CH_2CH_2CH=C(CH_3)_2$	4-Cl	n_D^{20} 1.5290
803	CH_3	CH_3	H	$-CH_2CH_2N$ 	H	n_D^{20} 1.5408
804	CH_3	CH_3	H	$-CH_2CCl=CHCl$	H	n_D^{20} 1.5578
805	CH_3	CH_3	H	$-\underset{\vert}{\overset{CH_3}{CH}}-C_6H_4-Cl$	4-Cl	n_D^{20} 1.5653
806	CH_3	CH_3	H	$-\underset{\vert}{\overset{CH_3}{CH}}-C_6H_4-C_4H_9-t$	H	n_D^{20} 1.5470

- Cont' d -

Table I(C) (Cont'd)

807	CH_3	CH_3	H		H	n_D^{20} 1.5662
808	CH_3	CH_3	H		H	n_D^{20} 1.5675
809	CH_3	CH_3	H		H	m.p. 86.9
810	CH_3	CH_3	H		H	n_D^{20} 1.5716
811	CH_3	CH_3	H		H	n_D^{20} 1.5674
812	CH_3	CH_3	H		H	n_D^{20} 1.5602
813	CH_3	CH_3	H		4-F	n_D^{20} 1.5524
814	CH_3	CH_3	H		4-Cl	n_D^{20} 1.5621

- Cont'd -

Table I(c) (Cont'd)

815	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-F$	4-OCH_3	n_D^{20} 1.5588
816	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-C_4H_9$-t	H	n_D^{20} 1.5653
817	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-C_4H_9$-t	4-F	n_D^{20} 1.5547
818	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-C_4H_9$-t	4-Cl	n_D^{20} 1.5688
819	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-C_4H_9$-t	4-OCH_3	n_D^{20} 1.5643
820	CH_3	CH_3	H	$-CH_2CH_2-C_6H_4-OCH_3$	H	n_D^{20} 1.5755
821	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_5$	H	n_D^{20} 1.5747
822	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_2H_5$	H	n_D^{20} 1.5654
823	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-Cl$	H	n_D^{20} 1.5757
824	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-Cl$	4-Cl	n_D^{20} 1.5751
825	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-Cl$	4-OCH_3	n_D^{20} 1.5733

- Cont'd -

Table I(c) (Cont'd)

826	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_4H_9$-t	H	n_D^{20} 1.5543
827	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_4H_9$-t	4-F	n_D^{20} 1.5450
828	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_4H_9$-t	4-Cl	n_D^{20} 1.5578
829	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_4H_9$-t	4-OCH_3	n_D^{20} 1.5539
830	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_5H_{11}$-n	H	n_D^{20} 1.5463
831	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-OCH_3$	H	n_D^{20} 1.5695
832	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_5H_{11}$-n	4-F	n_D^{20} 1.5332
833	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-OCH_3$	4-F	n_D^{20} 1.5613
834	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-OCH_3$	4-Cl	n_D^{20} 1.5760
835	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-OCH_3$	4-OCH_3	n_D^{20} 1.5690

- Cont'd -

Table I(b) (Cont'd)

836	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-SCF_2CF_2H$	H	n_D^{20} 1.5545
837	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-COOCH_3$	H	n_D^{20} 1.5722
838	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-COOC_4H_9$-t	H	n_D^{20} 1.5577
839	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_6H_{11}$	H	n_D^{20} 1.5660
840	CH_3	CH_3	H	$-CH_2CH_2CH_2-C_6H_4-C_6H_{11}$	4-F	n_D^{20} 1.5576
841	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_5$	4-Cl	n_D^{20} 1.5060
842	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_4-F$	H	n_D^{20} 1.5647
843	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_4-F$	4-Cl	n_D^{20} 1.5829
844	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_4-F$	4-OCH_3	n_D^{20} 1.5732
845	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_4-Cl$	H	n_D^{20} 1.5972

- cont'd -

Table I(b) (Cont'd)

846	CH_3		H	$-CH_2CH=CH-C_6H_4-Cl$	4-Cl	n_D^{20} 1.5980
847	CH_3	CH_3	H	$-CH_2CH=CH-C_6H_4-Cl$	H	m.p. 119.9
848	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_5$	H	n_D^{20} 1.6045
849	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-Cl$	4-Cl	n_D^{20} 1.5886
850	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-F$	H	Paste
851	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-F$	4-F	n_D^{20} 1.5828
852	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-Cl$	H	Paste
853	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-Cl$	4-F	Paste
854	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-Cl$	4-Cl	Paste
855	CH_3	CH_3	H	$-CH_2C\equiv C-C_6H_4-Cl$	$4-OCH_3$	n_D^{20} 1.5815

- Cont'd -

Table I(b) (Cont'd)

856	CH_3	CH_3		$-CH_3$	H	n_D^{20} 1.5822
857	CH_3	CH_3		$-CH_2CH=CH_2$	H	n_D^{20} 1.5800

Note 1. ^{1}HNMR value ($CDCl_3$, TMS) of Compound No.180:

1.62 (6H, s), 2.33 (3H, s), 3.53 (3H, s),

4.83 (2H, d, J=48Hz), 4.95 (2H, s),

6.7 - 7.9 (9H, m), 7.75 (1H, s)

Note 2. ^{1}HNMR value ($CDCl_3$, TMS) of compound No. 299:

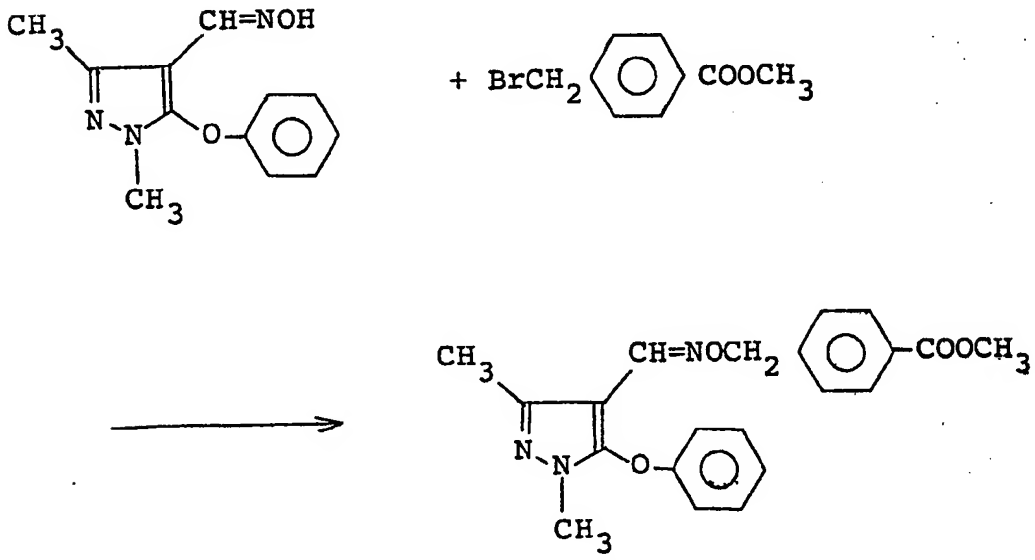
1.37 (6H, s), 2.34 (3H, s), 3.55 (3H, s),

4.53 (2H, d, J=47.5Hz), 4.95 (2H, s),

6.7 - 7.4 (9H, m), 7.76 (1H, s)

Production of the compounds of the present invention will be illstrated with reference to the following examples, but it is not limited to these examples.

Example 1 Methyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate (compound No. 16)

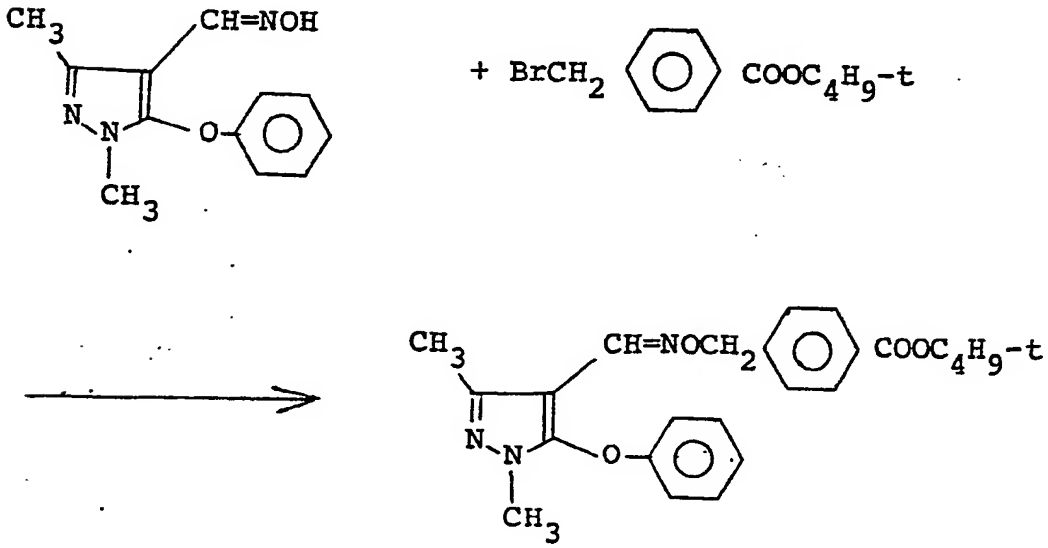


2.0 Grams (0.00865 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime, 1.98 g (0.00865 mole)

of methyl 4-bromomethylbenzoate and 1.19 g (0.009 mole) of potassium carbonate were added to 50 ml of acetone, and the resulting mixture was heated under reflux for 8 hours. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.0 g of the desired product.

Yield 61%. n_D^{20} 1.5612

Example 2 Tert-butyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate (compound No. 60)

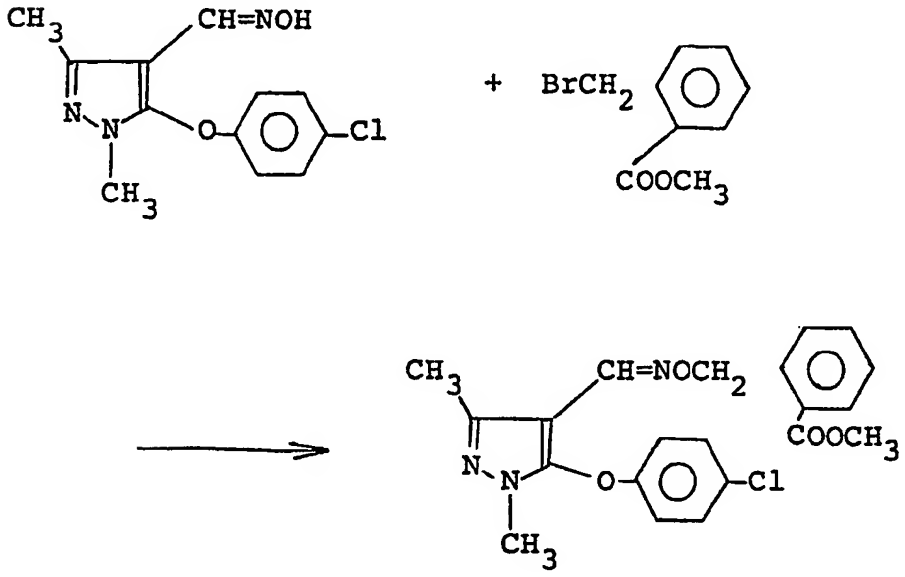


2.0 Grams (0.00855 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml

of dimethyl sulfoxide, and after adding 0.65 g (0.0116 mole) of powdery potassium hydroxide, the resulting mixture was stirred at 30°C for 30 minutes. To this solution was added 2.32 g (0.00855 mole) of tert-butyl 4-bromomethylbenzoate, and reaction was carried out at from 50° to 60°C for 1 hour. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain crude crystals. The crystals were recrystallized from methanol to obtain 2.4 g of the desired compound.

Yield 67.0%. m.p. 101.7°C.

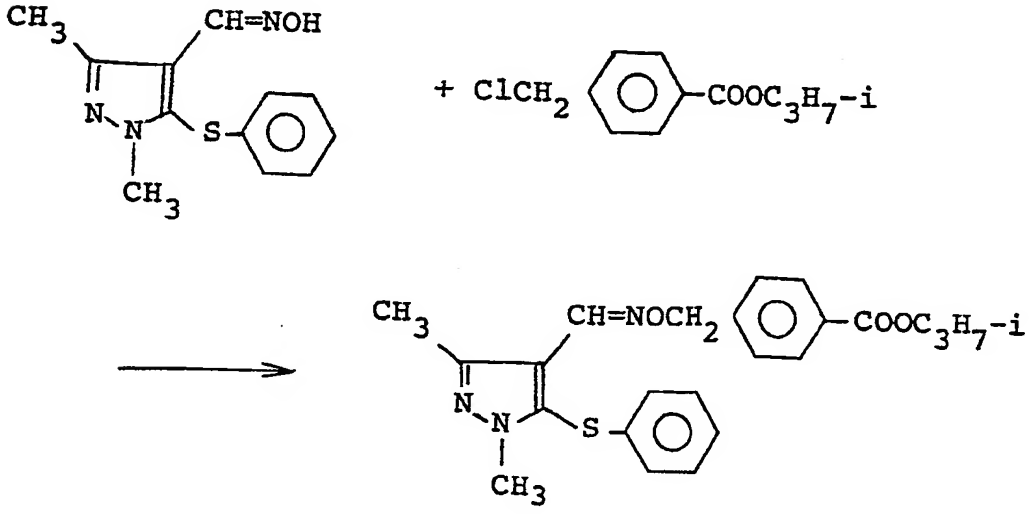
Example 3 Methyl 2-[{5-(4-chlorophenoxy)-1,3-dimethyl-pyrazol-4-yl}methyleneaminoxymethyl]benzoate (compound No. 3)



2.0 Grams (0.00755 mole) of 5-(4-chlorophenoxy)-1,3-dimethyl-pyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethylformamide, and after adding 0.5 g (0.0125 mole) of powdery sodium hydroxide, the resulting mixture was thoroughly stirred. To this solution was added 1.73 g (0.00755 mole) of methyl 2-bromomethylbenzoate, and reaction was carried out at from 70° to 80°C for 5 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.0 g cf the desired compound.

Yield 64.0%. n_D^{20} 1.5788.

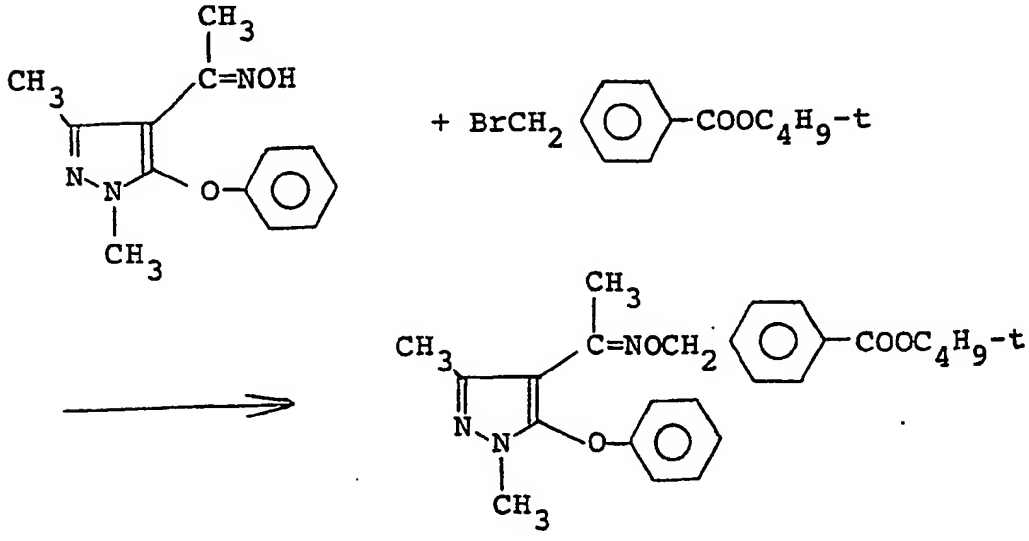
Example 4 Isopropyl 4-[(1,3-dimethyl-5-phenylthiopyrazol-4-yl)methyleneaminooxymethyl]benzoate (compound No. 174)



3.0 Grams (0.0121 mole) of 1,3-dimethyl-5-phenylthiopyrazole-4-carbaldehyde oxime, 2.57 g (0.0121 mole) of isopropyl 4-chloromethylbenzoate and 2.8 g (0.026 mole) of sodium carbonate were added to 50 ml of methyl ethyl ketone, and the resulting mixture was heated under reflux for 5 hours. After completion of the reaction, methyl ethyl ketone was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 3.0 g of the desired compound.

Yield 59.0%. n_D^{20} 1.5821.

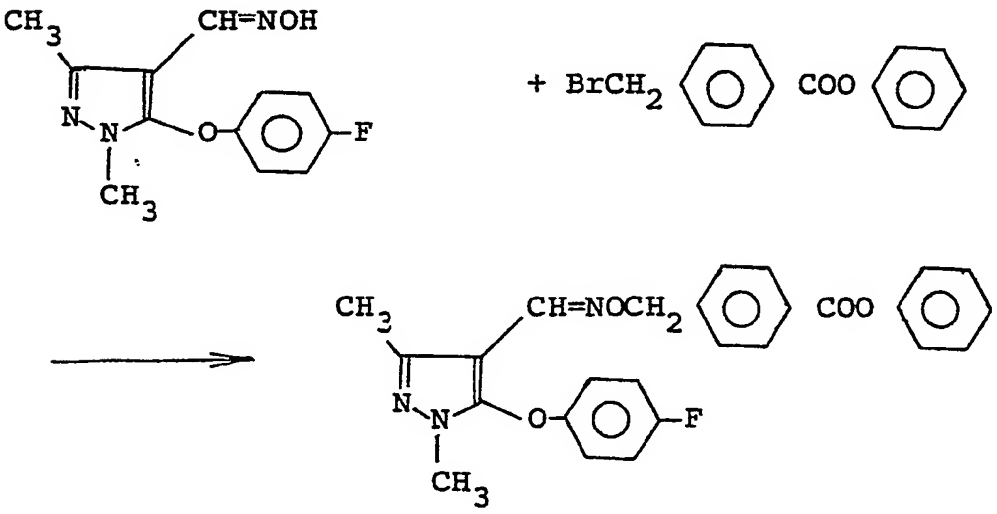
Example 5 Tert-butyl 4-[1-(1,3-dimethyl-5-phenoxypyrazol-4-yl)-ethylideneaminooxymethyl] benzoate (compound No. 166)



2.0 Grams (0.00816 mole) of methyl 1,3-dimethyl-5-phenoxy-pyraxol-4-yl ketone oxime, 2.2 g (0.00816 mole) of tert-butyl 4-bromomethylbenzoate and 4.0 g (0.028 mole) of potassium carbonate were added to 50 ml of acetonitrile, and the resulting mixture was heated under reflux for 5 hours. After completion of the reaction, acetonitrile was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain crude crystals. The crystals were recrystallized from methanol to obtain 2.8 g of the desired compound.

Yield 79.0%. m.p. 94.4°C.

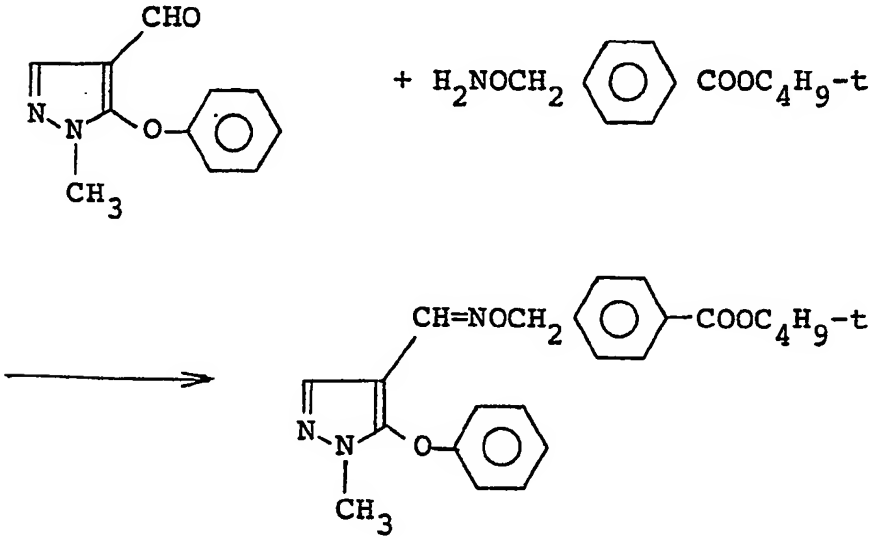
Example 6 Cyclohexyl 4-[{5-(4-fluorophenoxy)-1,3-dimethylpyrazol-4-yl}methyleneaminooxymethyl]benzoate (compound No. 119)



2.0 Grams (0.008 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime and 0.5 g (0.0125 mole) of powdery sodium hydroxide were added to 50 ml of dimethyl sulfoxide, and the resulting mixture was stirred for 30 minutes. To this solution was added 2.38 g (0.008 mole) of cyclohexyl 4-bromomethlbenzoate, and reaction was carried out at from 70° to 80°C for 6 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 3.0 g of the desired compound.

Yield 80.0%. n_D^{20} 1.5863.

Example 7 Tert-butyl 4-[(1-methyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate (compound No. 174)



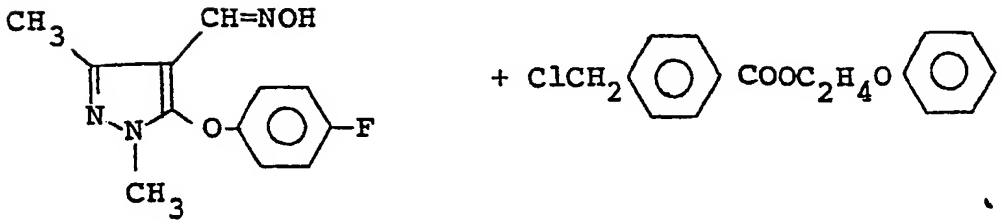
1.0 Gram (0.0049 mole) of 1-methyl-5-phenoxypyrazole-4-carbaldehyde and 1.1 g (0.0049 mole) of tert-butyl 4-aminooxymethylbenzoate were added to 20 ml of ethanol, and the resulting mixture was heated under reflux to carry out reaction. After completion of the reaction, ethanol was removed by evaporation, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.6 g of the desired compound.

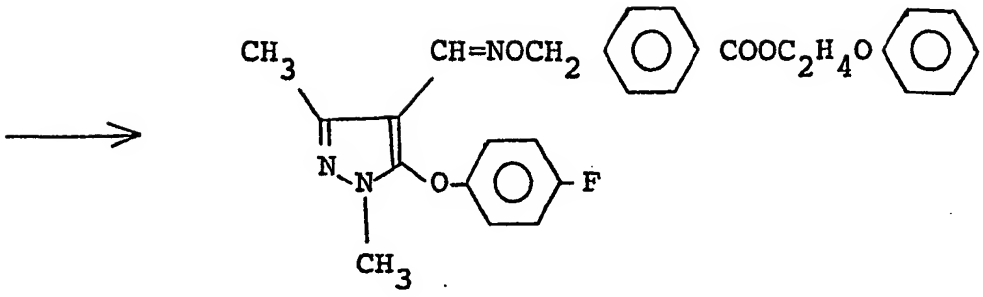
Yield 80%. Form of product: paste.

NMR ($CDCl_3$, TMS):

δ (ppm) 1.56 (s, 9H), 3.60 (s, 3H), 4.96 (s, 2H), 6.60 - 7.40 (m, 7H), 7.63 (s, 1H), 7.66 (s, 1H), 7.75 - 8.00 (m, 2H).

Example 8 2-phenoxyethyl 4-[{5-(4-fluorophenoxy)-1,3-dimethylpyrazol-4-yl}methyleneaminooxymethyl]benzoate (compound No. 142)

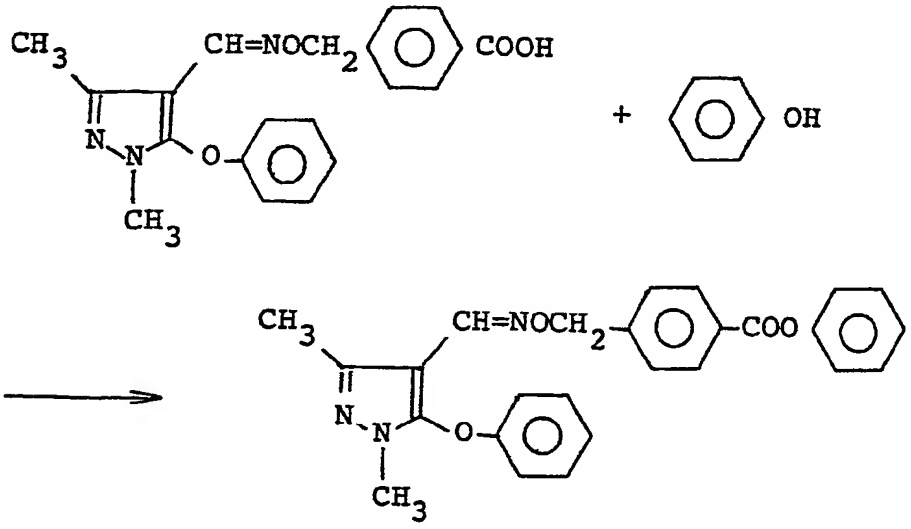




2.0 Grams (0.008 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.65 g (0.0116 mole) of powdery potassium hydroxide, the resulting solution was stirred at 30°C for 30 minutes. To this solution was added 2.5 g (0.00865 mole) of 2-phenoxyethyl 4-chloromethylbenzoate, and reaction was carried out at from 50° to 60°C for 1 hour. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 3.0 g of the desired compound.

Yield 75.0%. n_D^{20} 1.5655.

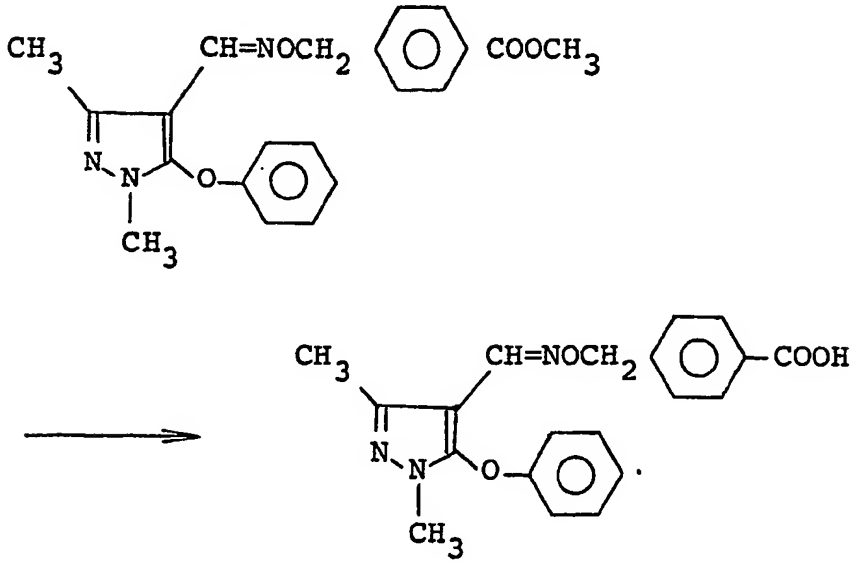
Example 9 Phenyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxy]benzoate (compound No. 161)



1.0 Gram (0.0027 mole) of 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoic acid, 0.25 g (0.0027 mole) of phenol and 0.7 g (0.0027 mole) of triphenylphosphine were added to 50 ml of ether, and the resulting mixture was stirred. To this solution was added 0.47 g (0.0027 mole) of diethyl azodicarboxylate, and the resulting solution was heated under reflux for 3 hours. After completion of the reaction, the ether layer was filtered, and ether was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 0.9 g of the desired compound.

Yield 76.0%. n_D^{20} 1.5656.

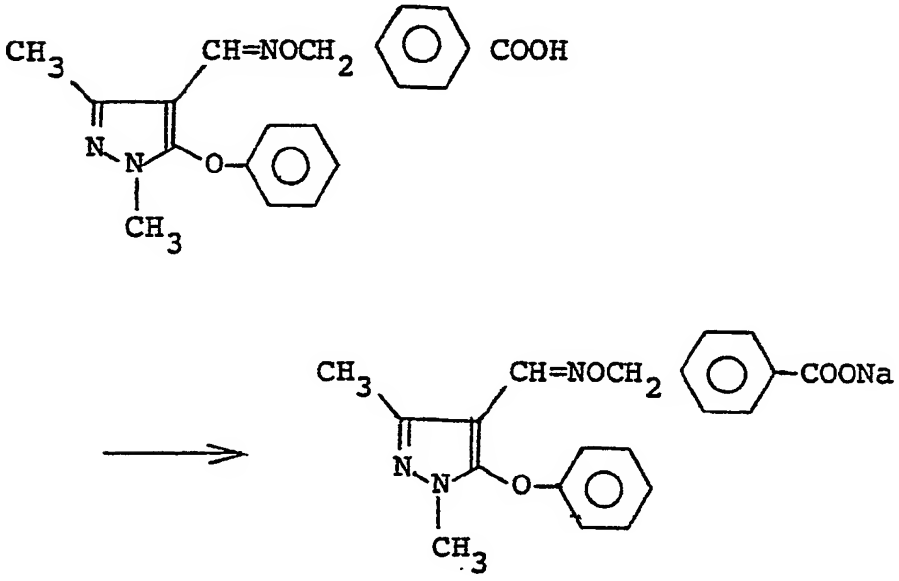
Example 10 4-[(1,3-Dimethyl-5-phenoxypyrazol-4-yl)-methyleneaminooxymethyl]benzoic acid (compound No. 14)



Three grams (0.0079 mole) of methyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]-benzoate was dissolved in 20 ml of methanol and a solution of 0.24 g of lithium hydroxide in 5 ml of water was added. Reaction was then carried out at room temperature for 2 hours. After completion of the reaction, methanol was removed by evaporation, and after adding water, the solution was acidified with hydrochloric acid to precipitate crystals. The crystals were collected by filtration to obtain 2 g of the desired compound.

Yield 70%. m.p. 183.3°C.

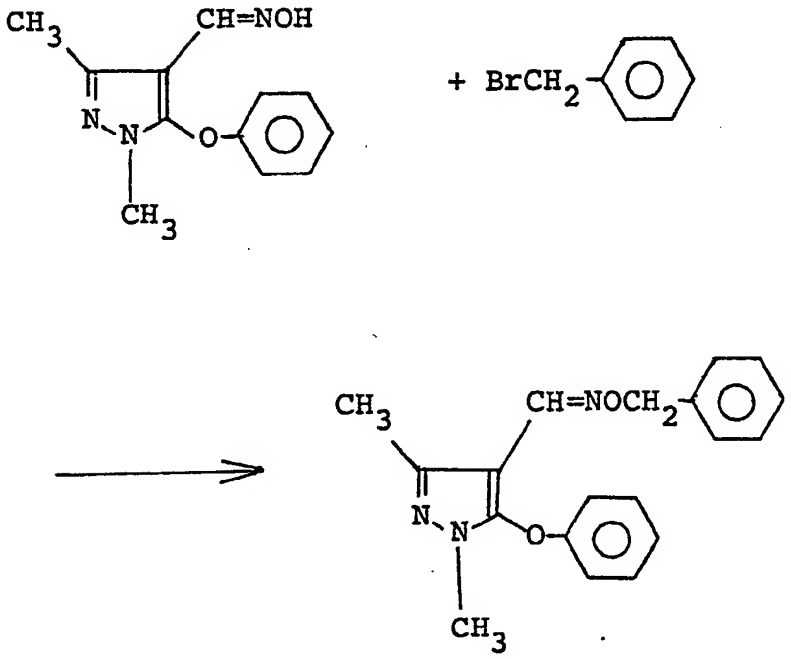
Example 11 Sodium 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoate (compound No. 15)



1.0 Gram (0.0027 mole) of 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoic acid and 0.07 g (0.0028 mole) of sodium hydroxide were added to 10 ml of water, and the resulting mixture was stirred for 2 hours. After completion of the reaction, water was removed by evaporation under reduced pressure to obtain the desired compound in a quantitative yield.

m.p. >300°C.

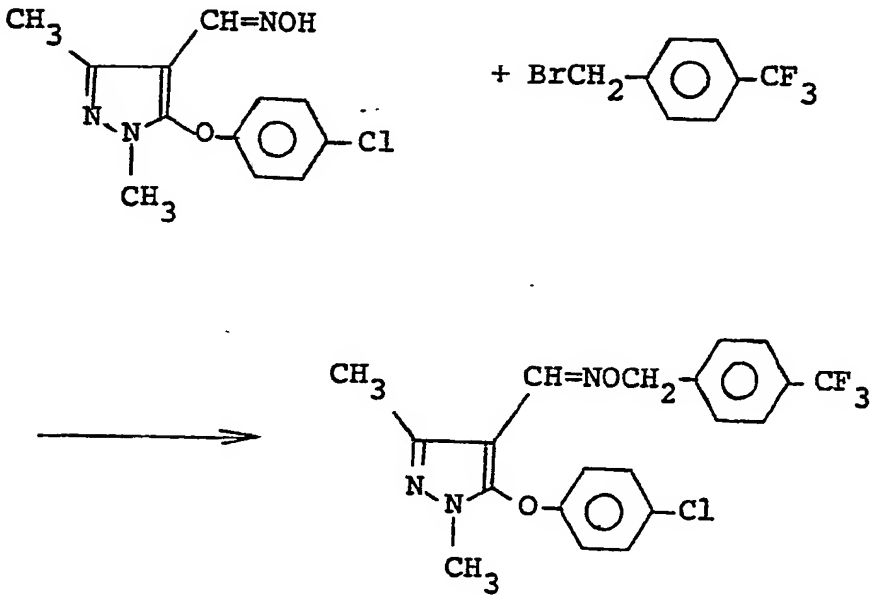
Example 12 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-benzyl ether (compound No. 181)



2.0 Grams (0.00866 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime, 1.5 g (0.0087 mole) of benzyl bromide and 2.0 g (0.0145 mole) of potassium carbonate were dissolved in 50 ml of acetone, and the resulting solution was heated under reflux for 7 hours. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.6 g of the desired compound.

Yield 93.0%. n_D^{20} 1.5517.

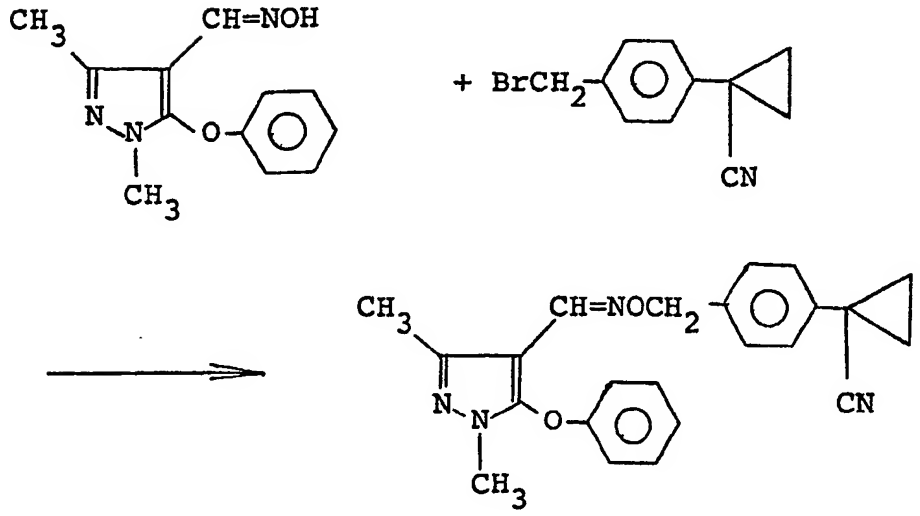
Example 13 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-trifluoromethylbenzyl ether (compound No. 195)



2.0 Grams (0.0075 mole) of 5-(chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime was dissolved in 40 ml of tetrahydrofuran, and after adding 0.19 g (0.0079 mole) of sodium hydride at room temperature, the resulting solution was stirred. Thereafter, 1.7 g (0.0071 mole) of 4-trifluoromethylbenzyl bromide was added, followed by heating under reflux for 3 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.7 g of the desired compound.

Yield 85.0%. n_D^{20} 1.5539.

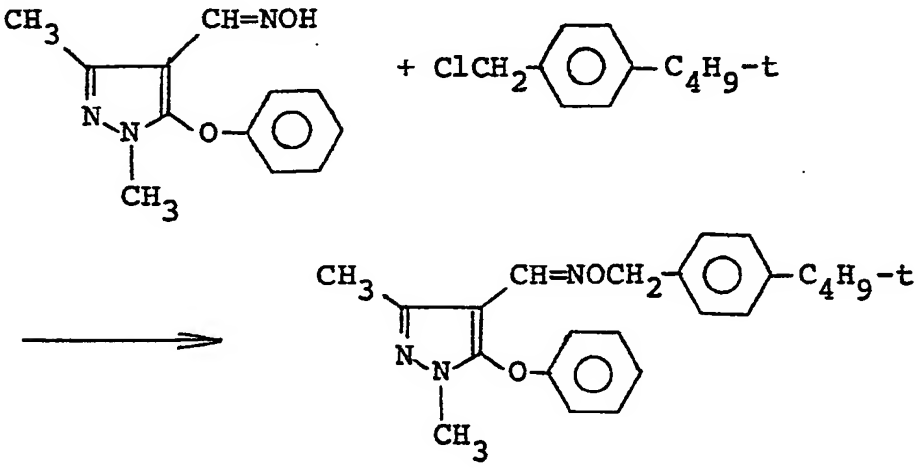
Example 14 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 0-4-(1-cyanocyclopropyl)benzyl ether (compound No. 199)



2.0 Grams (0.0086 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 30 ml of dimethylformamide, and a solution of 0.5 g (0.0125 mole) of sodium hydroxide in 5 ml of water was added. After stirring was continued for 30 minutes, 2.0 g (0.0086 mole) of 1-(4-bromomethylphenyl)cyclopropane-1-carbonitrile was added to the solution, and reaction was carried out at from 60° to 70°C for 3 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.8 g of the desired compound.

Yield 84.0%. m.p. 109.1°C.

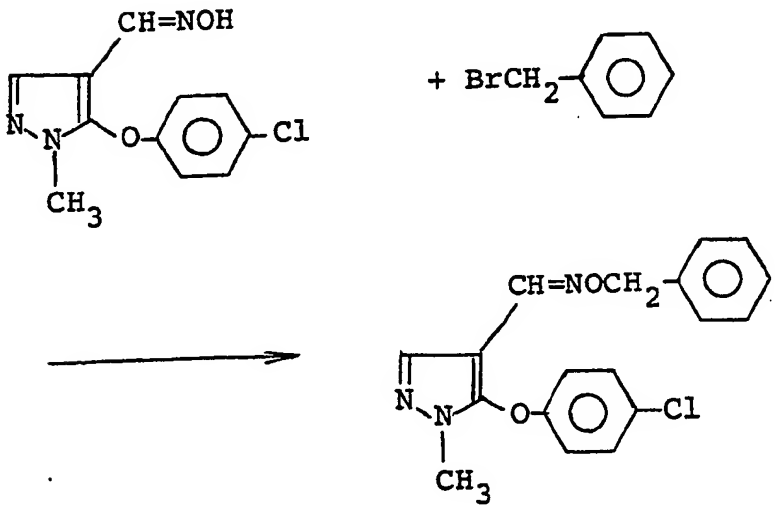
Example 15 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 4-tert-butylbenzyl ether (compound No. 205)



2.0 Grams (0.0086 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 1.0 g (0.0178 mole) of potassium hydroxide, the resulting solution was stirred at room temperature for 30 minutes. To this solution was added 1.5 g (0.0086 mole) of 4-tert-butylbenzyl chloride, and reaction was carried out at from 50° to 60°C for 3 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.4 g of the desired compound.

Yield 74.0%. n_D^{20} 1.5402.

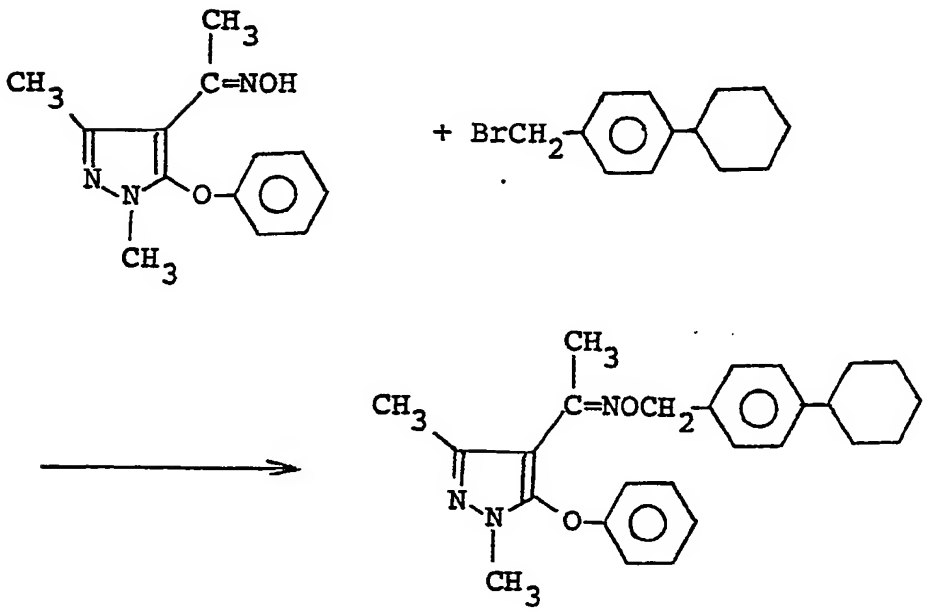
Example 16 5-(4-Chlorophenoxy)-1-methylpyrazole-4-carbaldehyde oxime O-benzyl ether (compound No. 279)



2.0 Grams (0.0092 mole) of 5-(4-chlorophenoxy)-1-methylpyrazole-4-carbaldehyde oxime, 1.5 g (0.0092 mole) of benzyl bromide and 2.0 g (0.0145 mole) of potassium carbonate were dissolved in 50 ml of acetonitrile, and the resulting solution was heated under reflux for 9 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.2 g of the desired compound.

Yield 78.0%. n_D^{20} 1.5933.

Example 17 1,3-Dimethyl-5-phenoxypyrazol-4-yl methyl ketone oxime O-4-cyclohexylbenzyl ether (compound No. 283)

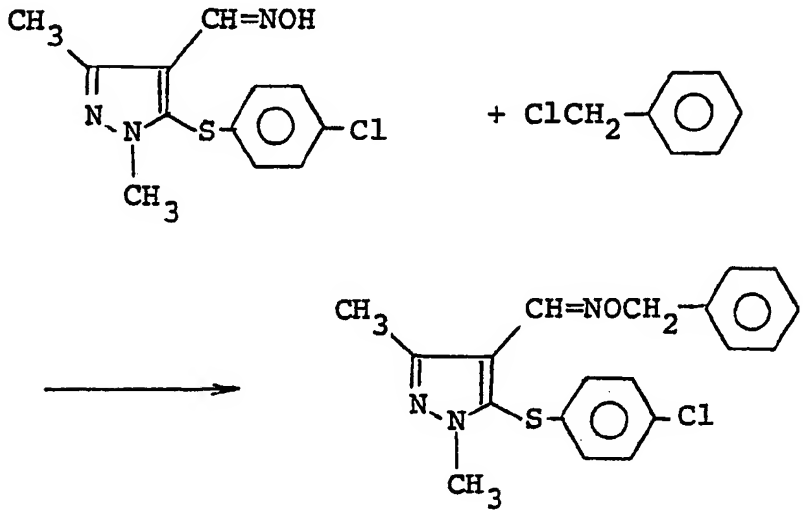


2.0 Grams (0.0040 mole) of 1,3-dimethyl-5-phenoxypyrazol-4-yl methyl ketone oxime was dissolved in 30 ml of dioxane, and 0.1 g (0.0042 mole) of sodium borohydride was added to the solution with thorough stirring. After 30 minutes, 1.6 g (0.0038 mole) of 4-cyclohexylbenzyl bromide was added to the reaction solution which was then heated under reflux for 5 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of

the desired compound.

Yield 72.0%. n_D^{20} 1.5775

Example 18 5-(4-Chlorophenylthio)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-benzyl ether (compound No. 290)

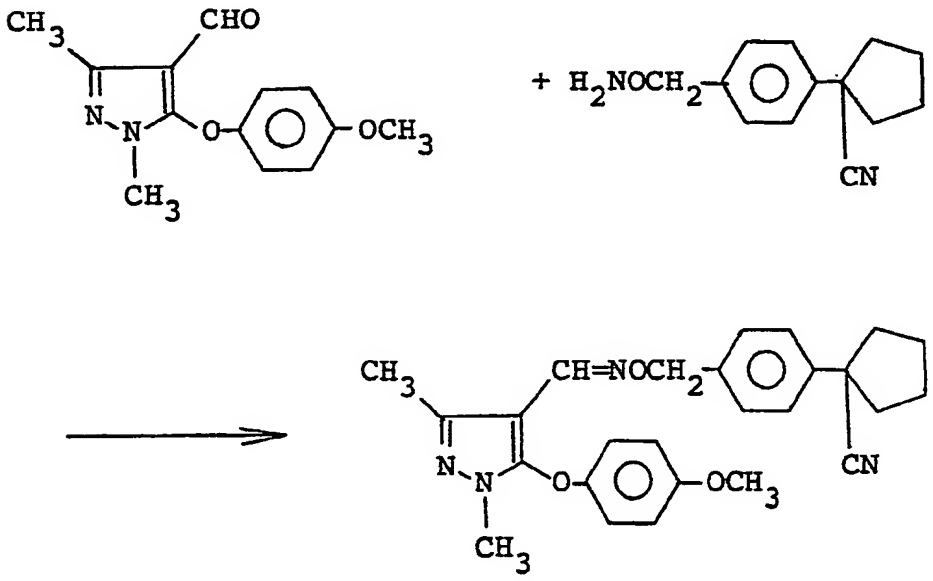


2.0 Grams (0.0071 mole) of 5-(4-chlorophenylthio)-1,3-dimethylpyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and to this solution was added a solution of 0.5 g (0.009 mole) of potassium hydroxide in 5 ml of water. After thorough stirring, 0.9 g (0.0071 mole) of benzyl choride was added, and reaction was carried out at from 60° to 70°C for 2 hours. After completion of the reaction, 100 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by

evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 2.3 g of the desired compound.

Yield 87.0%. n_D^{20} 1.5562.

Example 19 5-(4-Methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-(1-cyanocyclopentyl)-benzyl ether (compound No. 238)

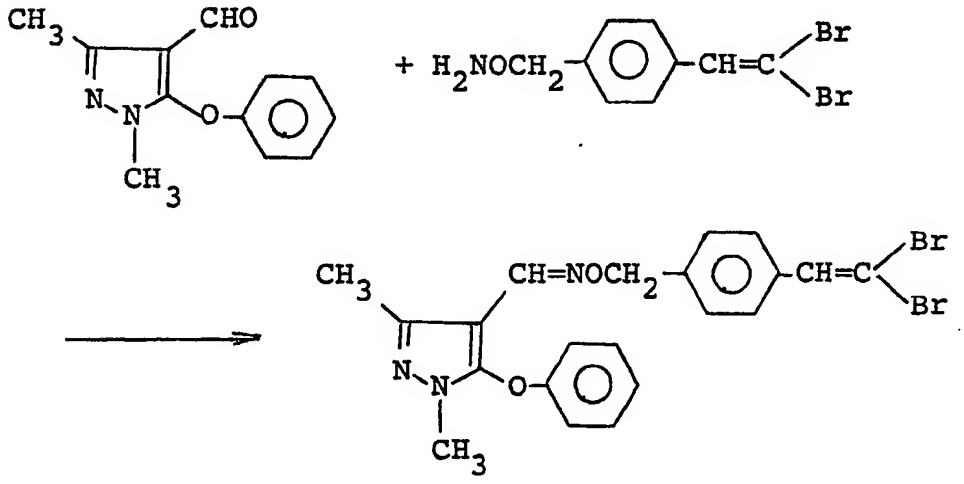


2.0 Grams (0.0081 mole) of 1,3-dimethyl-5-(4-methoxyphenoxy)pyrazole-4-carbaldehyde was dissolved in 50 ml of ethanol, and 1.7 g (0.0081 mole) of O-4-(1-cyanocyclopentyl)benzylhydroxylamine was added, after which reaction was carried out at from 50° to 60°C for 3 hours. After completion of the reaction, ethanol was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate.

The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 3.0 g of the desired compound.

Yield 83.0%. n_D^{20} 1.5632.

Example 20 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(2,2-dibromovinyl)benzyl ether (compound No. 262)

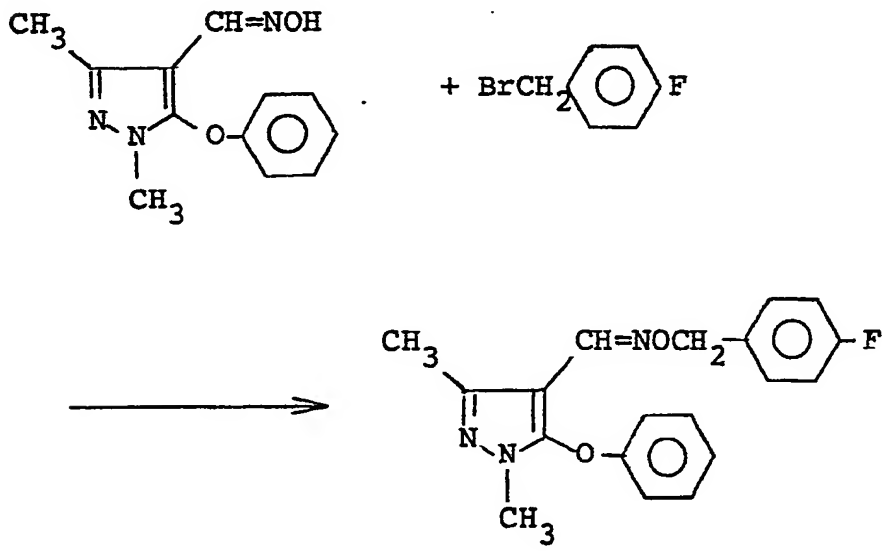


2.0 Grams (0.0093 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde was dissolved in 50 ml of methanol, and 2.8 g (0.0091 mole) of O-4-(2,2-dibromovinyl)benzylhydroxylamine was added to the solution which was then heated under reflux for 3 hours. After completion of the reaction, methanol was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate.

The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatpgraphed on silica gel to obtain 3.5 g of the desired compound.

Yield 76.0%. m.p. 109.3°C.

Example 21 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-fluorobenzyl ether (compound No. 305)

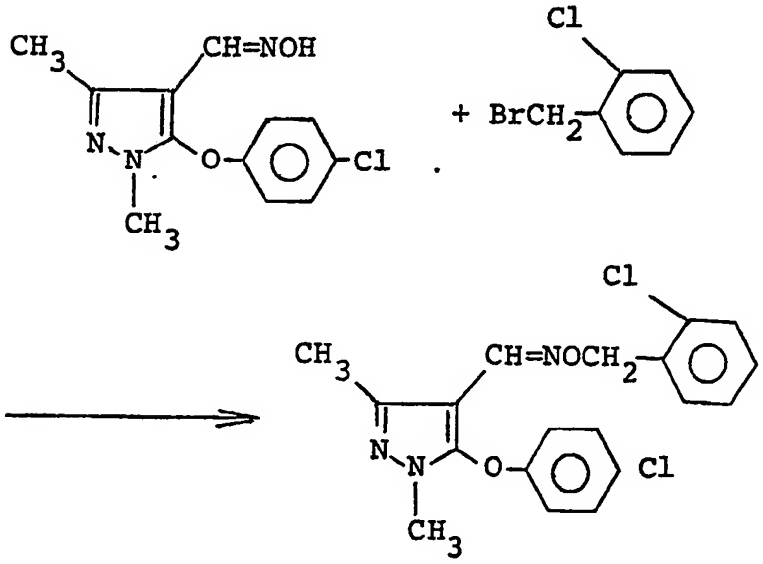


1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of powdery potassium hydroxide, the resulting solution was stirred. To this reaction solution was added 0.81 g (0.0043 mole) of 4-fluorobenzyl bromide, and reaction was carried out at room temperature for 3 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl

acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3g of the desired compound.

Yield 89%. n_D^{20} 1.5681.

Example 22 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-2-chlorobenzyl ether (compound No. 309)

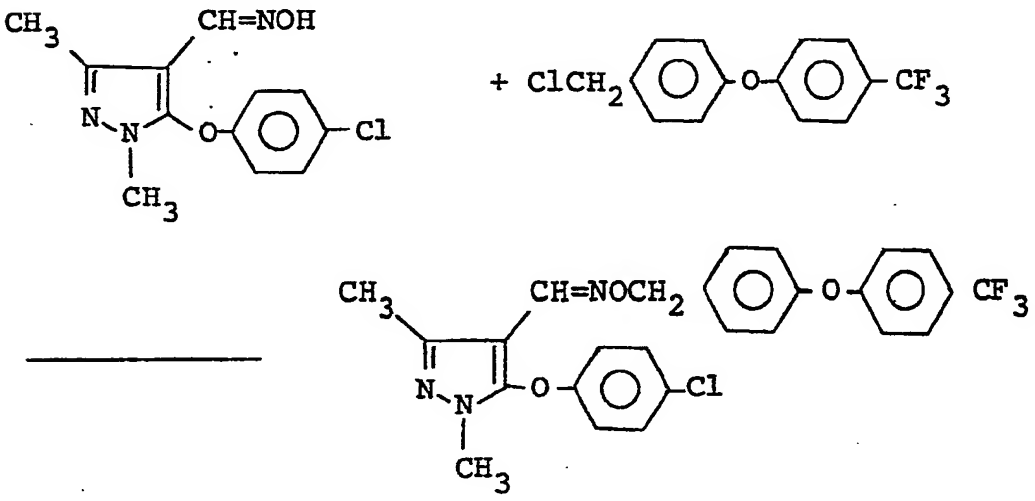


1.0 Gram (0.0038 mole) of 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 0.78 g (0.0038 mole) of 2-chlorobenzyl bromide and 1.0 g (0.0072 mole) of potassium carbonate were added to 20 ml of acetonitrile, and the resulting mixture was heated under reflux for 6 hours. After completion of the reaction, acetonitrile was removed by evaporation under reduced pressure, after which

water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 81%. n_D^{20} 1.5760

Example 23 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-(4-trifluoromethyl-phenoxy)benzyl ether (compound No. 322)

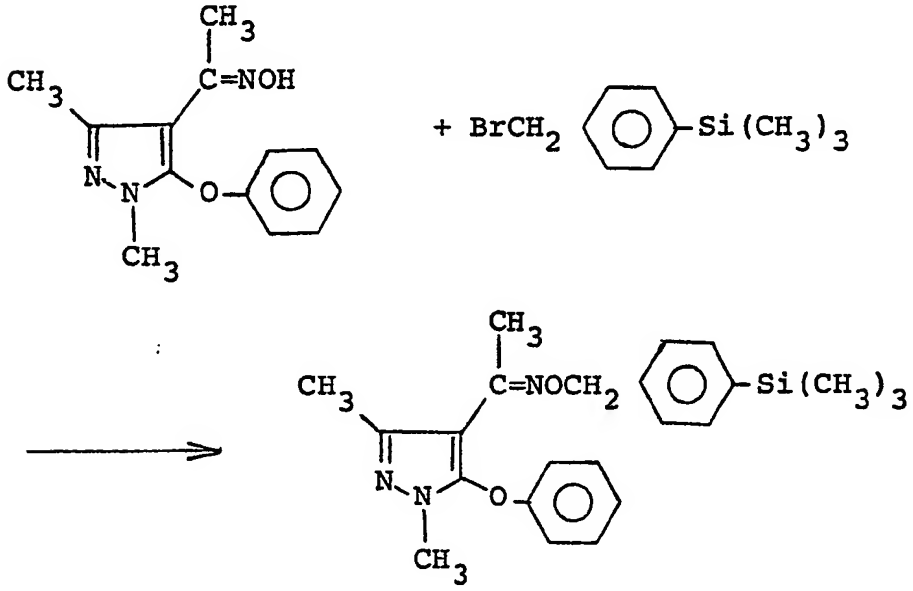


1.0 Gram (0.0038 mole) of 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 1.1 g (0.0038 mole) of 4-(4-trifluoromethylphenoxy)benzyl chloride and 0.8 g (0.076 mole) of sodium carbonate were added to 40 ml of acetone, and the resulting mixture was heated under reflux for 8 hours. After completion of the reaction,

acetone was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 72%. m.p. 97.8°C.

Example 24 1,3-Dimethyl-5-phenoxypyrazol-4-yl methyl ketone oxime O-4-trimethylsilylbenzyl ether (compound No. 334)

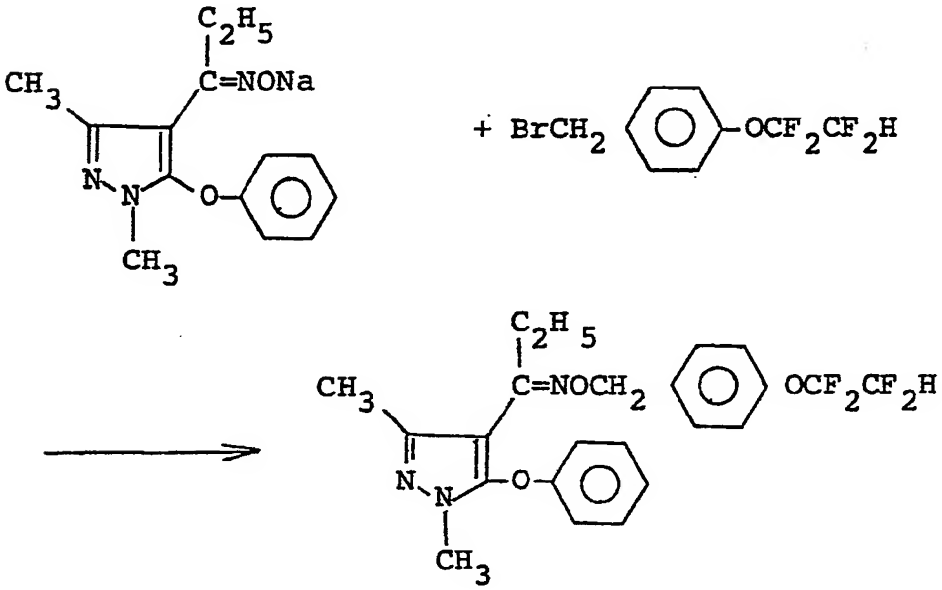


1.0 Gram (0.0041 mole) of 1,3-dimethyl-5-phenoxypyrazol-4-yl methyl ketone oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of potassium hydroxide, the resulting solution was stirred. To this reaction solution was added 1.0 g (0.0041 mole) of 4-trimethylsilylbenzyl bromide, and reaction was

carried out at room temperature for 4 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.5 g of the desired compound.

Yield 92%. m.p. 61.2°C.

Example 25 1,3-Dimethyl-5-phenoxypyrazol-4-yl ethyl ketone oxime 0-4-(1,1,2,2-tetrafluoroethoxy)benzyl ether (compound No. 354)

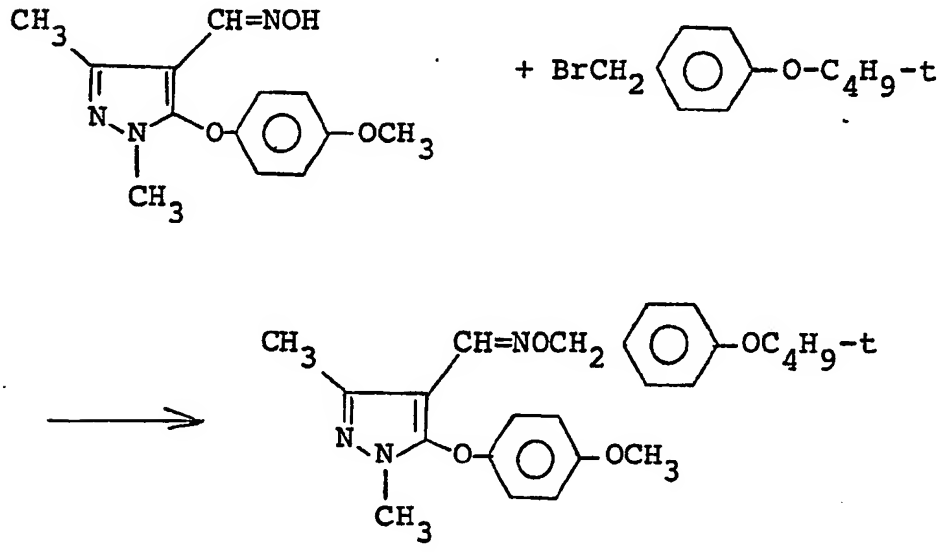


1.0 Gram (0.0035 mole) of sodium salt of 1,3-dimethyl-5-phenoxypyrazol-4-yl ethyl ketone oxime and 1.0 g (0.0035 mole) of 4-(1,1,2,2-tetrafluoroethoxy)benzyl

bromide were added to 50 ml of acetone, and the resulting mixture was heated for 5 hours to carry out reaction. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 76%. n_D^{20} 1.5252.

Example 26 5-(4-Methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-tert-butoxybenzyl ether (compound No. 366)

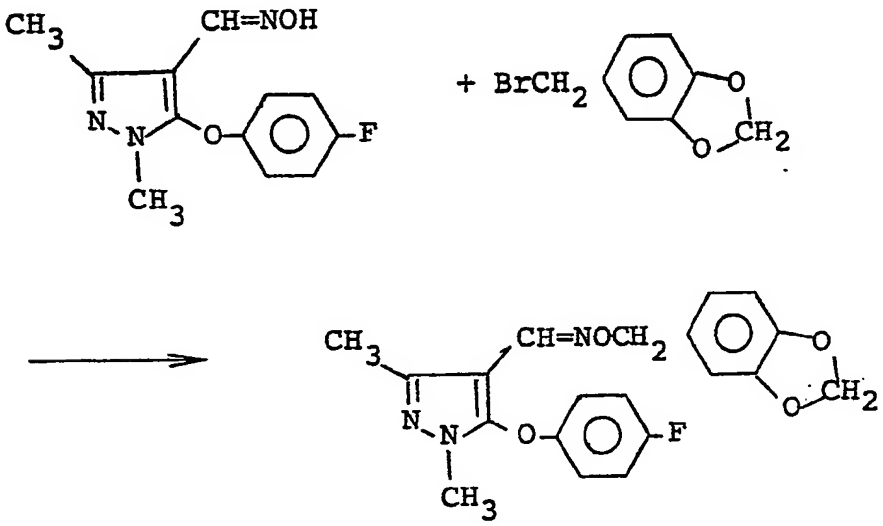


1.0 Gram (0.0038 mole) of 5-(4-methoxyphenoxy)-1,3-dimethyl-pyrazole-4-carbaldehyde oxime was dissolved in 30 ml of tetrahydrofuran, and 0.092 g of sodium hydride was

added to synthesize the sodium salt of said oxime. To this solution was added 0.92 g (0.0038 mole) of 4-tert-butoxybenzyl bromide, and reaction was carried out at from 50° to 60°C for 5 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. THis oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 80%. n_D^{20} 1.5653

Example 27 5-(4-Fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-3,4-methylenedioxybenzyl ether (compound No. 374)

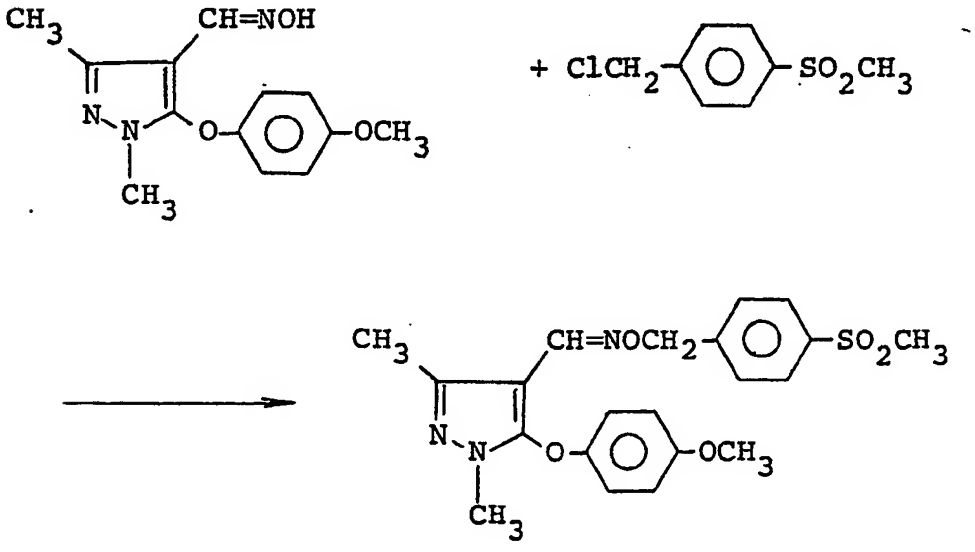


1.0 Gram (0.0040 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethylformamide, and after adding 0.2 g (0.005

mole) of sodium hydroxide, the resulting solution was stirred for 30 minutes. To this reaction solution was added 0.86 g (0.004 mole) of 3,4-methylenedioxybenzyl bromide, and reaction was carried out at from 40° to 50°C for 3 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.1 g of the desired compound.

Yield 72%. n_D^{20} 1.5750.

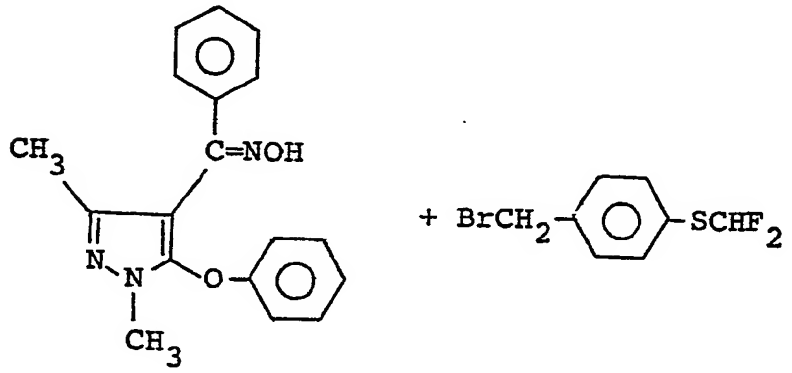
Example 28 5-(4-Methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-methylsulfonylbenzyl ether (compound No. 401)

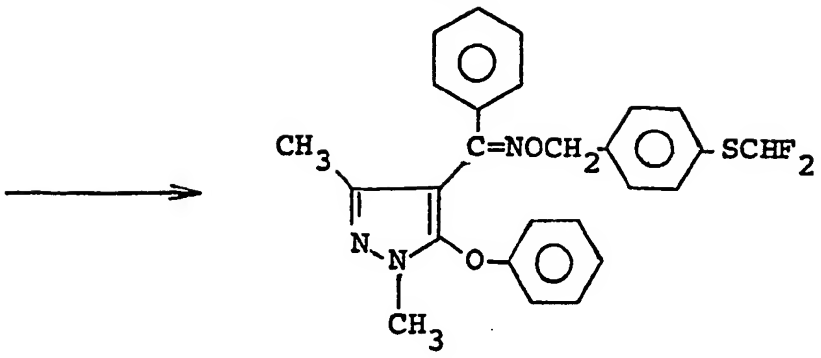


1.0 Gram (0.0038 mole) of 5-(4-methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime and 0.79 g (0.0038 mole) of 4-methylsulfonylbenzyl chloride were dissolved in 30 ml of tetrahydrofuran. To this solution was added 0.6 g (0.0039 mole) of 1,8-diazabicyclo[5.4.0]-7-undecene, and reaction was carried out at from 40° to 50°C for 5 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 74%. n_D^{20} 1.5866.

Example 29 1,3-Dimethyl-5-phenoxypyrazol-4-yl phenyl ketone oxime O-4-difluoromethylthiobenzyl ether (compound No. 426)

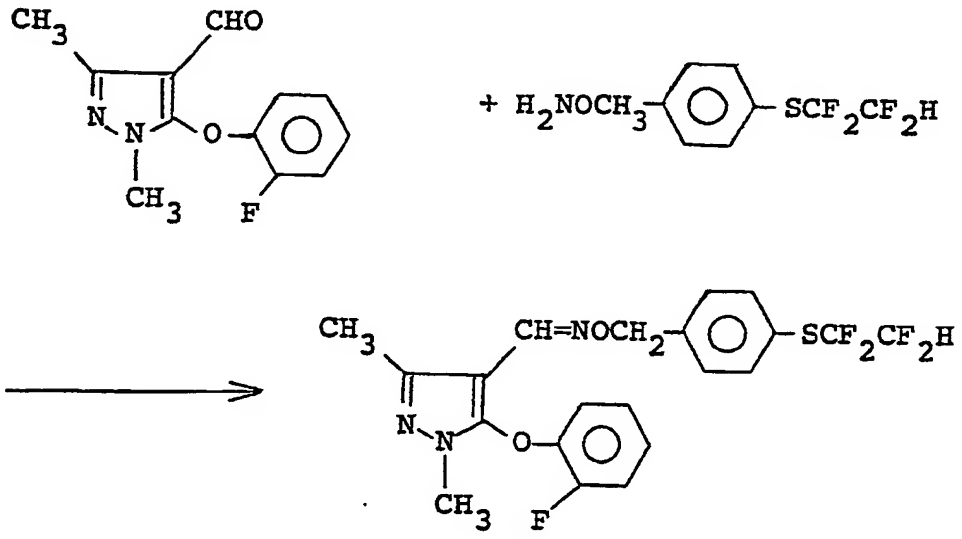




1 1.0 Gram (0.0033 mole) of 1,3-dimethyl-5-phenoxypyrazol-4-yl phenyl ketone oxime, 0.82 g (0.0033 mole) of 4-difluoromethylthiobenzyl bromide and 1.0 g (0.0072 mole) of potassium carbonate were added to 50 ml of 5 acetone, and the resulting mixture was heated for 6 hours to carry out reaction. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed 10 with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 86%. n_D^{20} 1.5917.

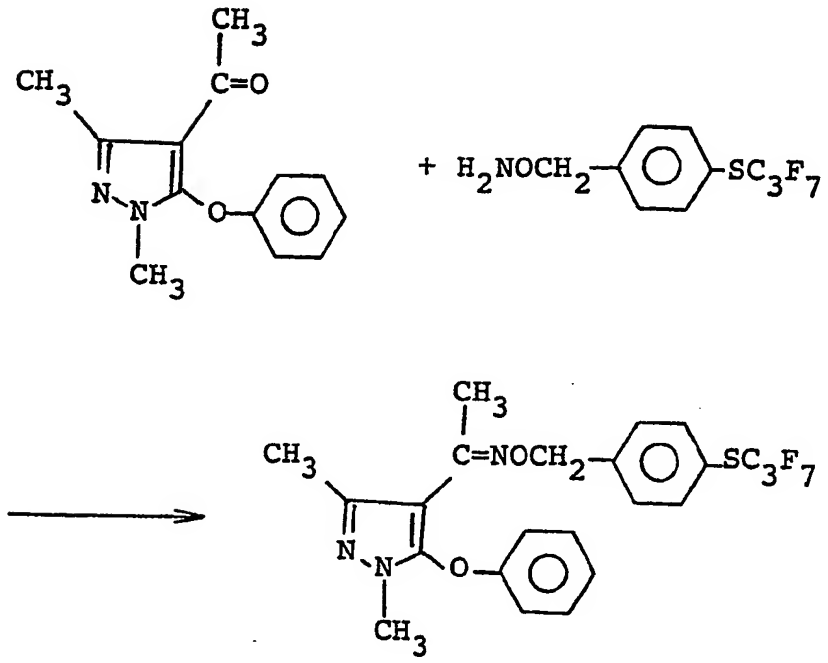
Example 30 5-(2-Fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-(1,1,2,2-tetrafluoroethylthio)benzyl ether (compound No. 467)



1.1 Gram (0.0043 mole) of 5-(2-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde was dissolved in 30 ml of ethanol, and 1.1 g (0.0043 mole) of O-[4-(1,1,2,2-tetrafluoroethylthio)benzyl]hydroxylamine was added. Reaction was then carried out at from 50° to 60°C for 2 hours. After completion of the reaction, ethanol was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with chloroform. The chloroform extract was dried, chloroform was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound

Yield 64%. n_D^{20} 1.5462.

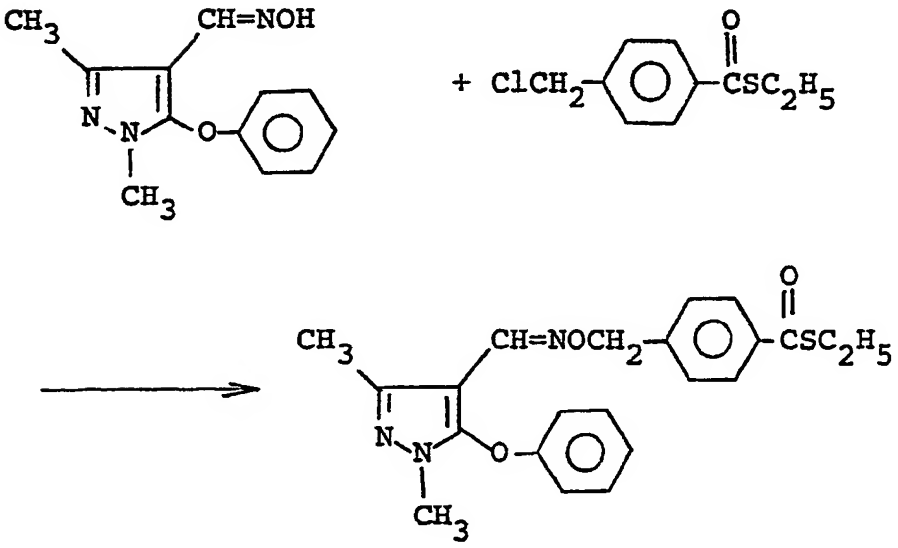
Example 31 1,3-Dimethyl-5-phenoxypyrazol-4-yl methyl ketone oxime O-4-heptafluoropropylthiobenzyl ether (compound No. 494)



1.0 Gram (0.0043 mole) of 4-acetyl-1,3-dimethyl-5-phenoxypyrazole and 1.4 g (0.0043 mole) of O-(4-heptafluoropropylthiobenzyl)hydroxylamine were added to 30 ml of methanol, and the resulting mixture was heated for 5 hours to carry out reaction. After completion of the reaction, methanol was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with chloroform. The chloroform extract was dried, and chloroform was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to 1.4 g of the desired compound.

Yield 60%. n_D^{20} 1.5217.

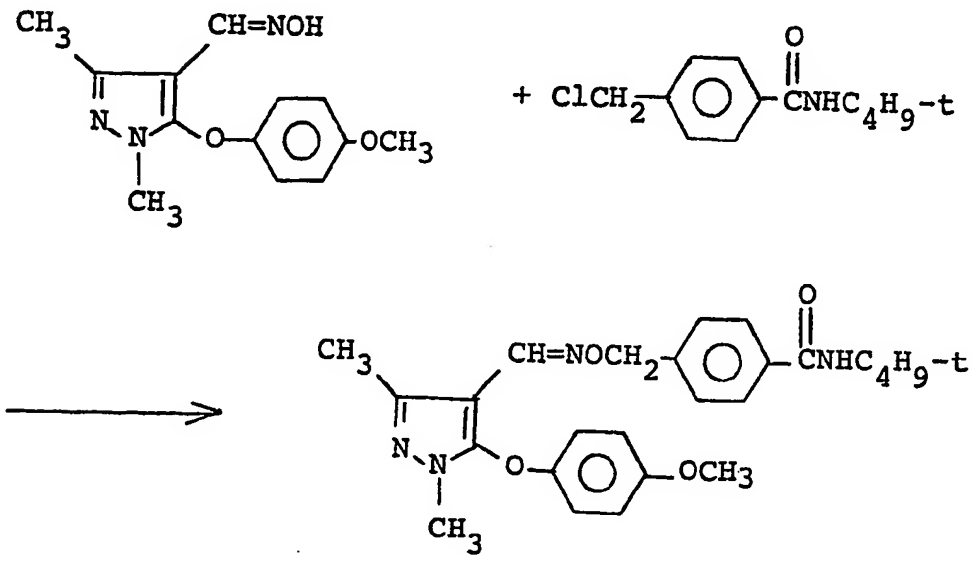
Example 32 S-Ethyl 4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminoxymethyl]benzothioate (compound No. 516)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of powdery potassium hydroxide, the resulting solution was stirred. To this solution was added 0.92 g (0.0043 mole) of S-ethyl 4-chloromethylbenzothiate, and reaction was carried out at room temperature for 3 hours. After completion of the reaction, 200 ml of water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 80%. n_D^{20} 1.5889.

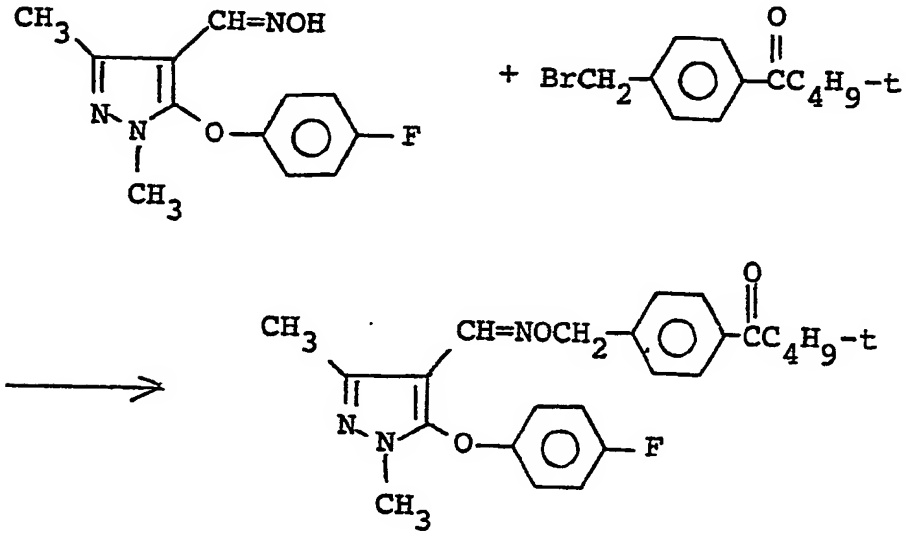
Example 33 N-Tert-butyl 4-[{5-(4-methoxyphenoxy)-1,3-dimethylpyrazol-4-yl}methyleneaminomethyl]-benzamide (compound No. 525)



1.0 Gram (0.0038 mole) of 5-(4-methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 0.86 g (0.0038 mole) of N-tert-butyl-4-chloromethylbenzamide and 1.0 g (0.0072 mole) of potassium carbonate were added to 20 ml of acetonitrile, and the resulting mixture was heated under reflux for 6 hours. After completion of the reaction, acetonitrile was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 82%. n_D^{20} 1.5662.

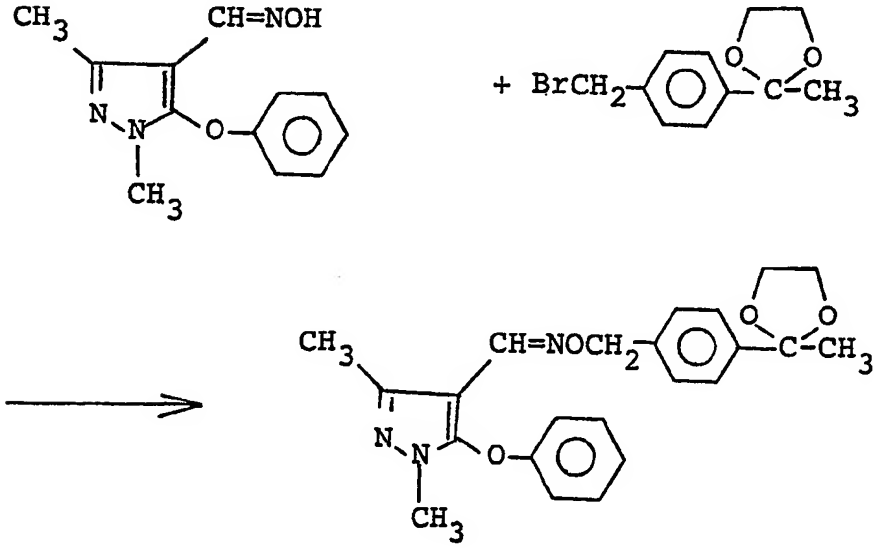
Example 34 5-(4-Fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-4-pivaloylbenzyl ether (compound No. 548)



1.0 Gram (0.0040 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 1.0 g (0.0039 mole) of tert-butyl 4-bromomethylphenyl ketone and 1.0 g (0.0094 mole) of sodium carbonate were added to 40 ml of acetone, and the resulting mixture was heated to carry out reaction. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.5 g of the desired compound.

Yield 89%. n_D^{20} 1.5567.

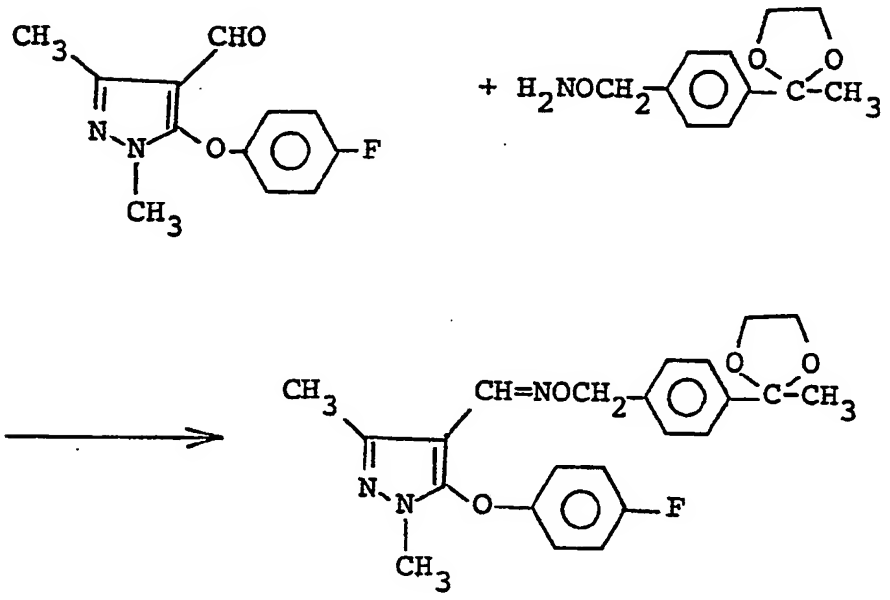
Example 35 2-Methyl-2-[4-{(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminoxymethyl}phenyl]-1,3-dioxolane (compound No. 562)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dioxane, and 0.14 g (0.0058 mole) of sodium hydride was added. Thereafter, 1.1 g (0.0043 mole) of 2-(4-bromomethylphenyl)-2-methyl-1,3-dioxolane was added to this solution which was then heated under reflux for 3 hours. After completion of the reaction, the reaction solution was poured into 200 ml of cold water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 74%. n_D^{20} 1.5698.

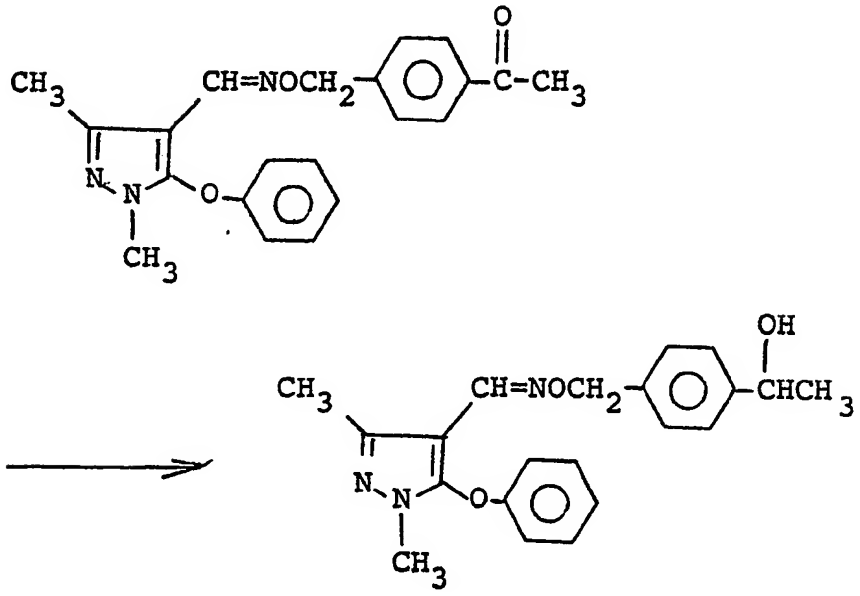
Example 36 2-[4-[{5-(4-Fluorophenoxy)-1,3-dimethylpyrazol-4-yl}methyleneaminoxymethyl]phenyl]-2-methyl-1,3-dioxolane (compound No. 563)



1.1 Gram (0.0043 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde and 0.9 g (0.0043 mole) of 2-[4-(aminooxymethyl)phenyl]-2-methyl-1,3-dioxolane were added to 20 ml of ethanol, and the resulting mixture was heated for 3 hours to carry out reaction. After completion of the reaction, ethanol was removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 72%. n_D^{20} 1.5555.

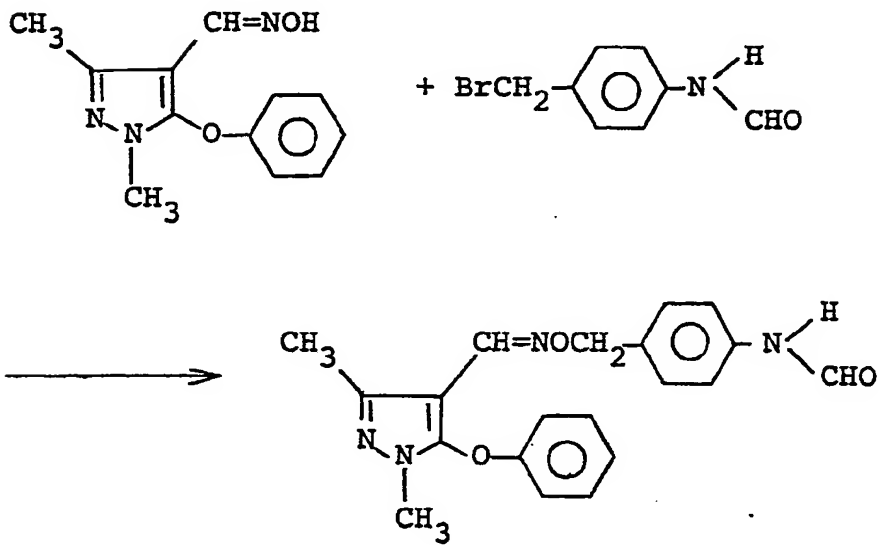
Example 37 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(1-hydroxyethyl)benzyl ether (compound No. 584)



1.0 Gram (0.0028 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime-O-4-acetylbenzyl ether, 1.0 g (0.0026 mole) of sodium borohydride and 1 g (0.025 mole) of sodium hydroxide were added to 100 ml of methanol, and the resulting mixture was heated under reflux for 3 hours. After completion of the reaction, methanol was removed by evaporation under reduced pressure, after which water added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 0.8 g of the desired compound.

Yield 78%. n_D^{20} 1.5748.

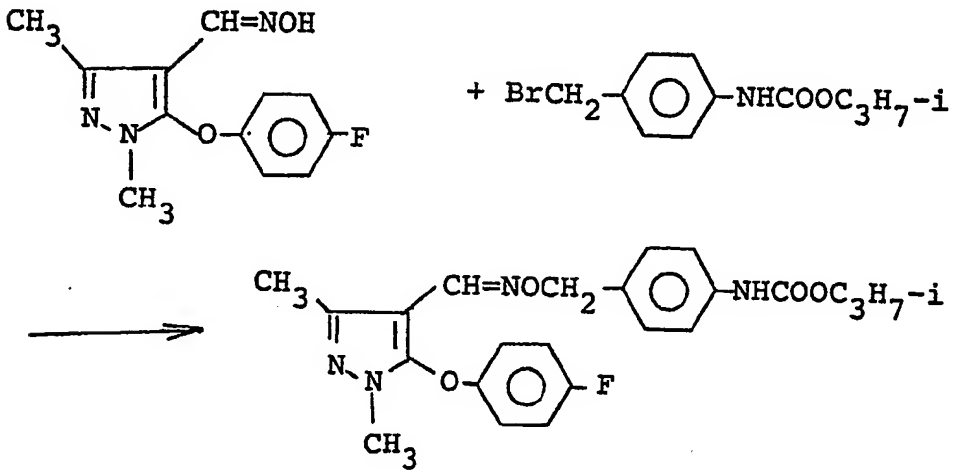
Example 38 N-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]phenylformamide (compound No. 589)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of powdery potassium hydroxide, the resulting solution was stirred. To this reaction solution was added 0.92 g (0.0043 mole) of N-(4-bromomethylphenyl)formamide, and reaction was carried out at room temperature for 3 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 76%. m.p. 105.3°C.

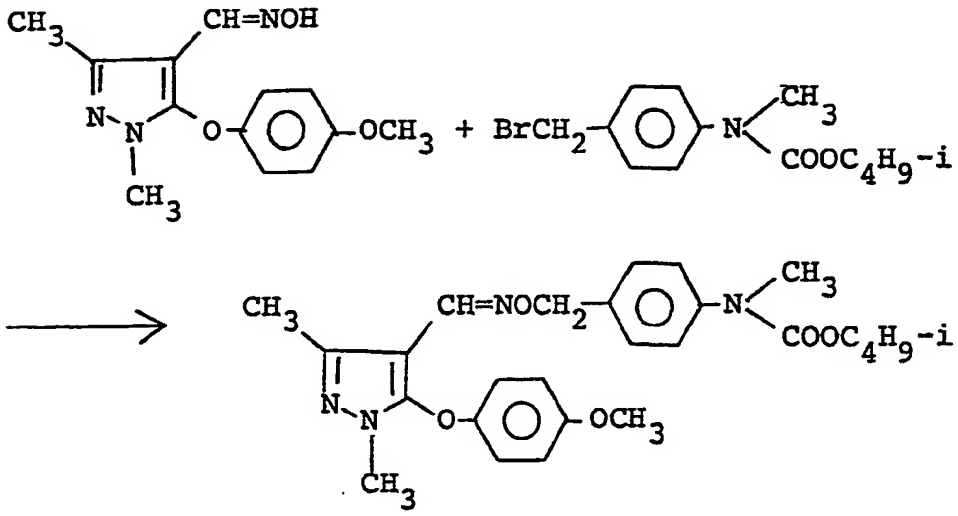
Example 39 Isopropyl N-4-[{5-(4-fluorophenoxy)-1,3-dimenthylpyrazol-4-yl}methyleneaminooxymethyl]-phenylcarbamate (compound No. 595)



1.0 Gram (0.0040 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 1.1 g (0.0040 mole) of isopropyl N-4-bromomethylphenylcarbamate and 1.0 g (0.0072 mole) of potassium carbonate were added to 20 ml of acetonitrile, and the resulting mixture was heated under reflux for 6 hours. After completion of the reaction, acetonitrile was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was colum-chromatographed on silica gel to obtain 1.5 g of the desired compound.

Yield 85%. n_D^{20} 1.5645.

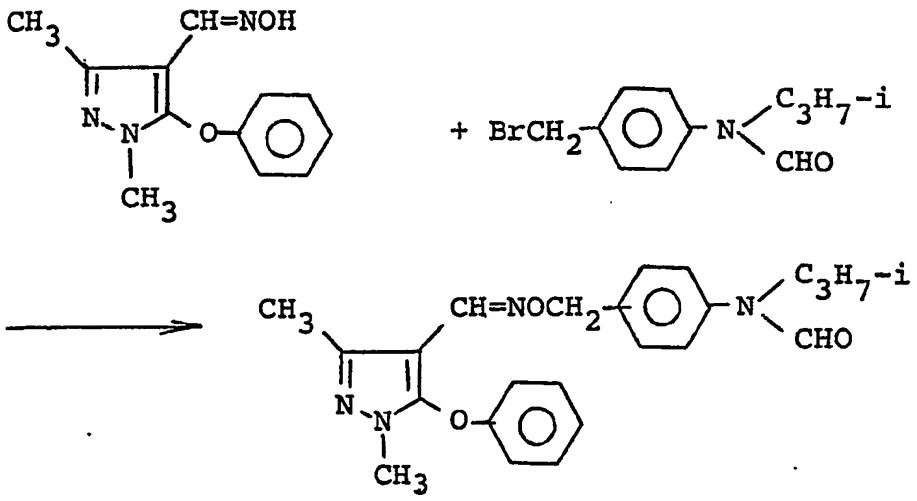
Example 40 Isobutyl N-4-[{5-(4-methoxyphenoxy)-1,3-dimethylpyrazol-4-yl}methyleneamino-oxymethyl]phenylcarbamate (compound No. 617)



1.0 Gram (0.0038 mole) of 5-(4-methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 1.1 g (0.0038 mole) of isobutyl N-4-bromomethylphenyl-N-methylcarbamate and 1.0 g (0.0094 mole) of sodium carbonate were added to 40 ml of acetone, and the resulting mixture was heated to carry out reaction. After completion of the reaction, acetone was removed by evaporation under reduced pressure, after which water was added and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.5 g of the described compound.

Yield 83%. n_D^{20} 1.5538.

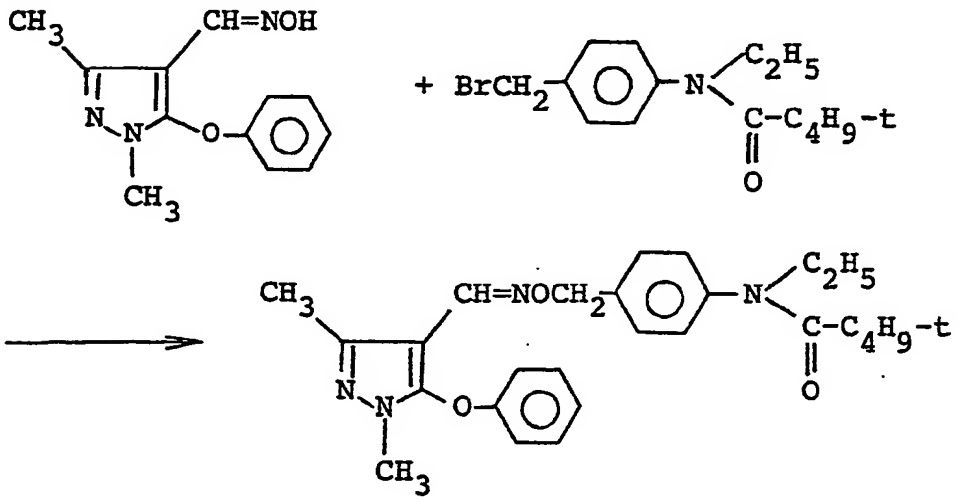
Example 41 N-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl) methyleneaminooxymethyl]phenyl-N-isopropylformamide (compound No. 636)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dioxane, and 0.1 g (0.0043 mole) of sodium hydride was added to synthesize the sodium salt of said oxime. To this reaction solution was added 1.1 g (0.0043 mole) of N-4-bromomethylphenyl-N-isopropylformamide, and reaction was carried out at from 40° to 50°C for 3 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oil product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 75%. m.p. 73.3°C.

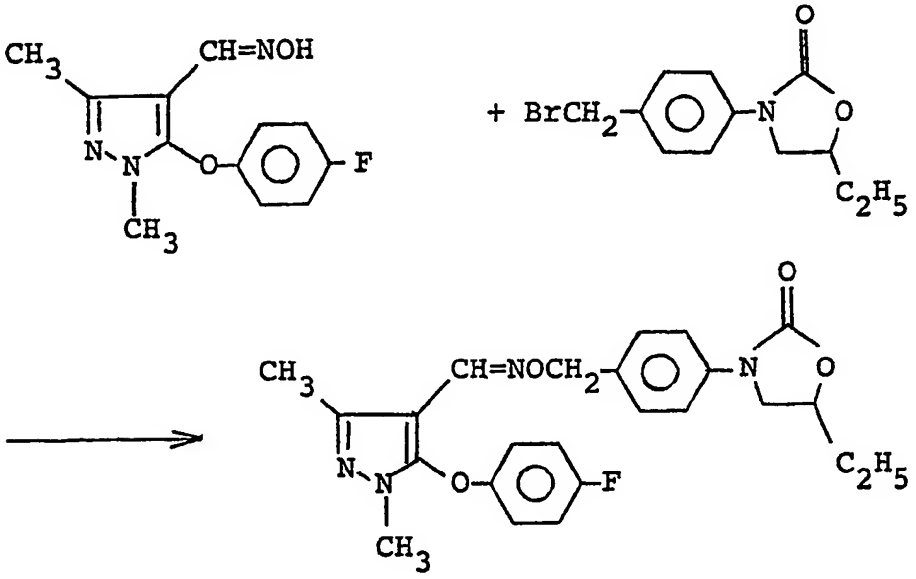
Example 42 N-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)-methyleneaminooxymethyl]phenyl-N-ethylpivalamide (compound No. 647)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime, 1.3 g (0.0043 mole) of N-4-bromomethylphenyl-N-ethylpivalamide and 0.2 g (0.005 mole) of potassium hydroxide were dissolved in 30 ml of dimethyl sulfoxide, and reaction was carried out at from 40° to 50°C for 6 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.5 g of the desired compound.

Yield 78%. Form of product: paste.

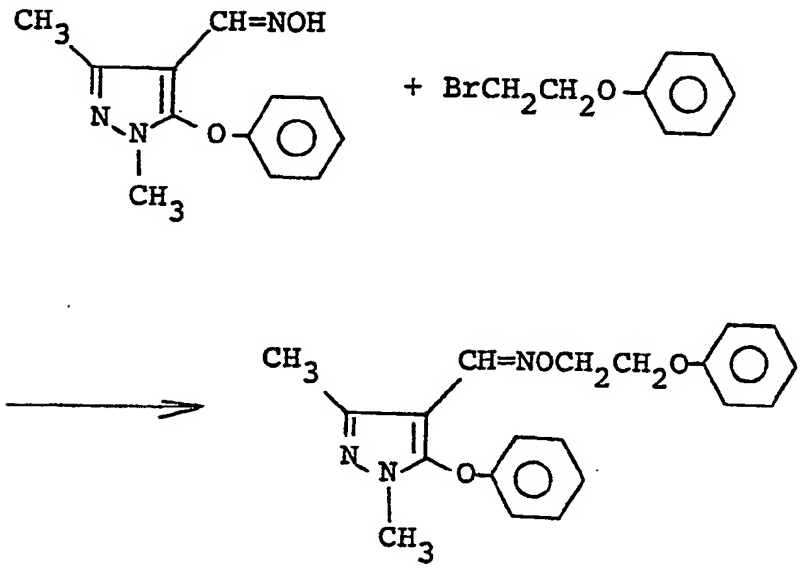
Example 43 5-Ethyl-3-[N-4[{5-(4-fluorophenoxy)-1,3-dimethylpyrazol-4-yl}methyleneaminooxymethy]-phenyl]-2-oxazolidone (compound No. 657)



1.0 Gram (0.0040 mole) of 5-(4-fluorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime and 1.1 g (0.0040 mole) of 3-(4-bromomethylphenyl)-5-ethyl-2-oxazolidone were dissolved in 20 ml of dimethyl sulfoxide, and 0.3 g (0.0053 mole) of powdery potassium hydroxide was added. Reaction was then carried out at from 40° to 50°C for 5 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 72%. n_D^{20} 1.5601.

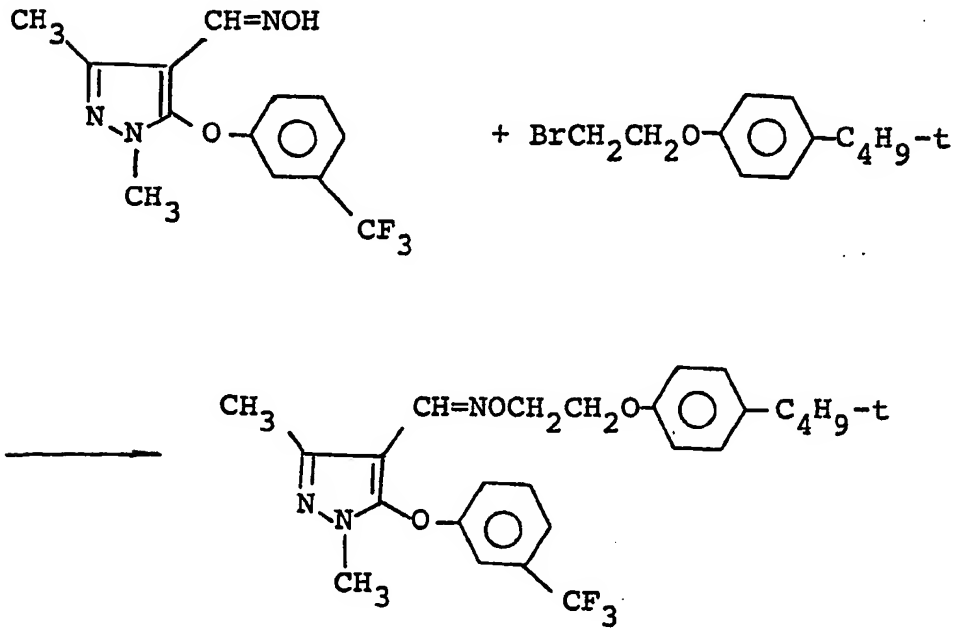
Example 44 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 0-2-phenoxyethyl ether (compound No. 658)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of powdery potassium hydroxide, the resulting solution was stirred. To this solution was added 0.86 g (0.0043 mole) of 2-bromoethoxybenzene, and reaction was carried out at room temperature for 3 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 86%. n_D^{20} 1.5657.

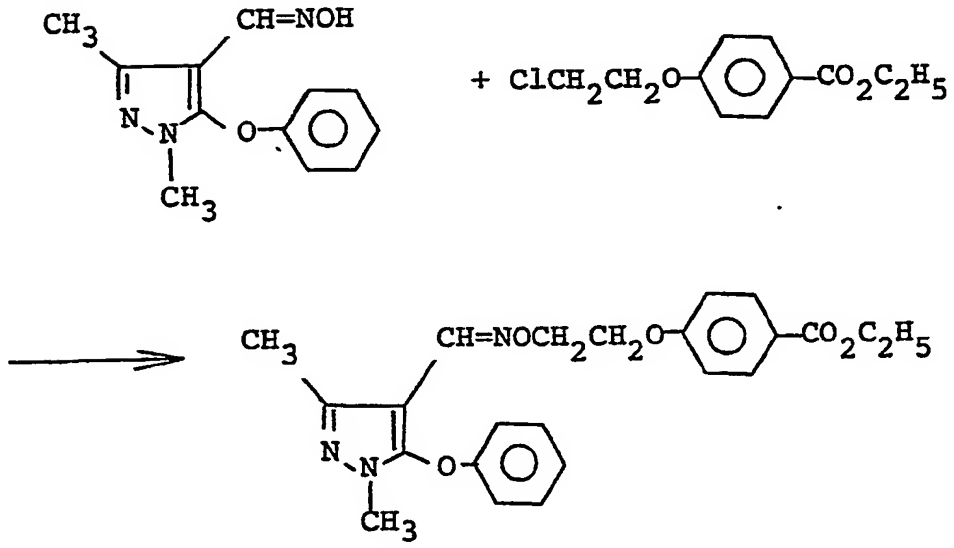
Example 45 1,3-Dimethyl-5-(3-trifluoromethyphenoxy)-pyrazole-4-carbaldehyde oxime O-2-(4-tert-butylphenoxy)ethyl ether (compound No. 671)



1.0 Gram (0.0030 mole) of 1,3-dimethyl-5-(3-trifluoromethylphenoxy)pyrazole-4-carbaldehyde oxime, 0.86 g (0.0034 mole) of p-(2-bromoethoxy)-tert-butylbenzene and 1.38 g of potassium carbonate were added to 50 ml of acetonitrile, and the resulting mixture was heated under reflux for 8 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 89%. n_D^{20} 1.5287.

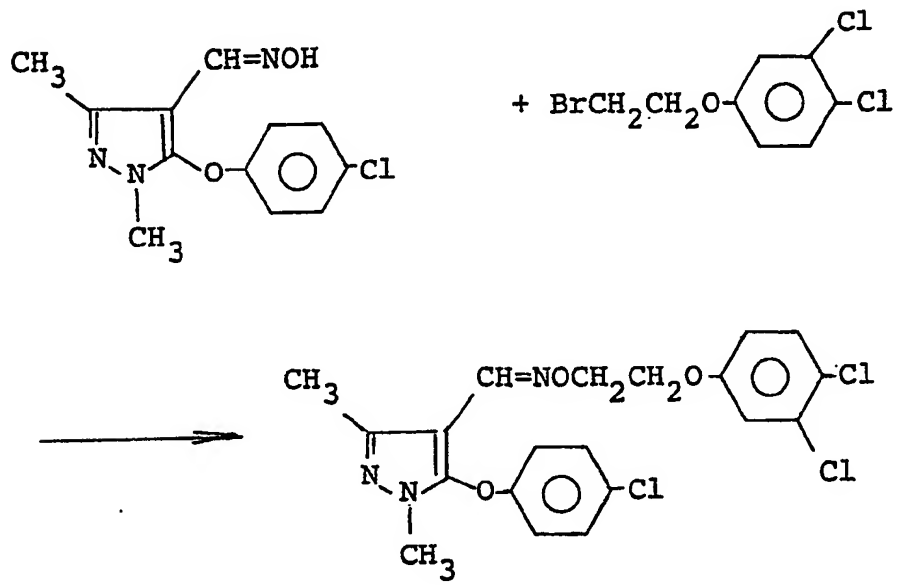
Example 46 Ethyl 4-[2-{(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxy}ethoxy]benzoate (compound No. 706)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime and 0.3 g (0.0075 mole) of powdery sodium hydroxide were added to 30 ml of dimethylformamide, and the resulting mixture was stirred. To this solution was added 0.99 g (0.0043 mole) of ethyl p-(2-chloroethoxy)benzoate, and reaction was carried out at from 30° to 40°C for 3 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 72%. n_D^{20} 1.5577.

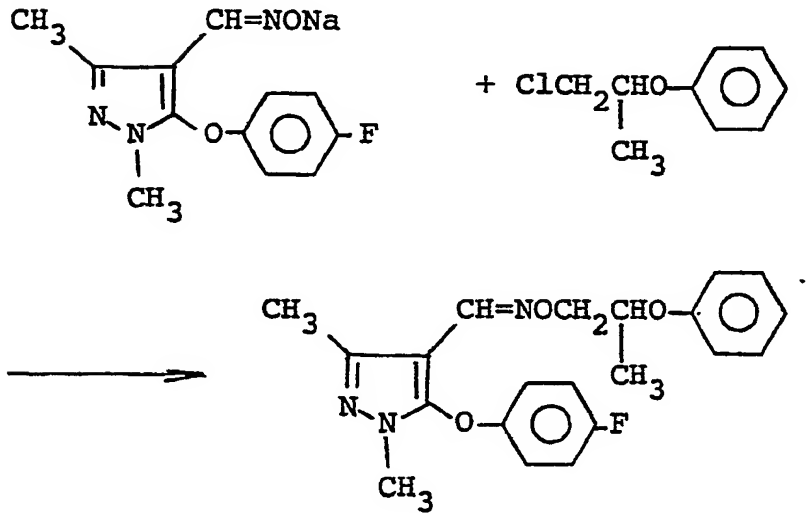
Example 47 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-2-(3,4-dichlorophenoxy)-ethyl ether (compound No. 723)



1.0 Gram (0.0038 mole) of 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 1.0 g (0.0038 mole) of 2-bromoethoxy-3,4-dichlorobenzene and 0.58 g (0.0038 mole) of 1,8-diazabicyclo[5.4.0]-7-undecene were dissolved in 50 ml of dioxane, and reaction was carried out at from 60° to 80°C for 5 hours with stirring. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.5 g of the desired compound.

Yield 87%. n_D^{20} 1.5756.

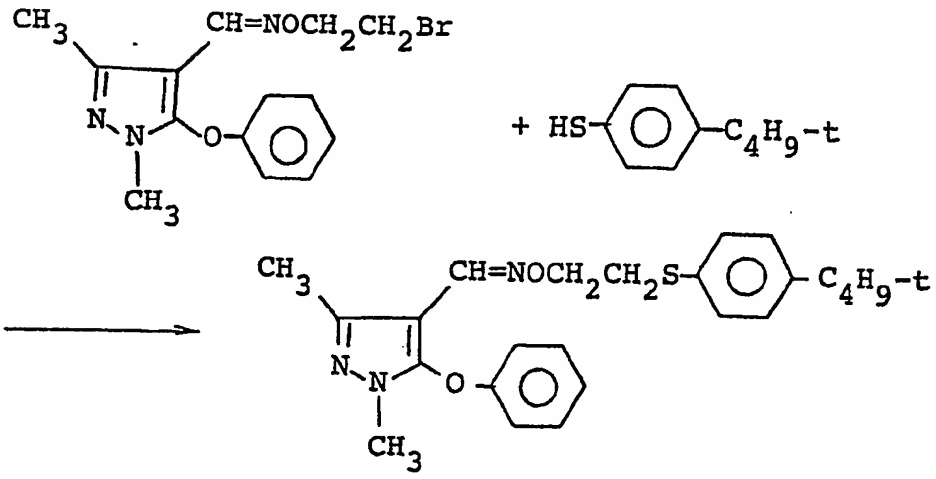
Example 48 5-(4-Fluorophenoxy)-1,3-dimethylpyazole-4-carbaldehyde oxime O-2-phenoxypropyl ether (compound No. 741)



1.0 Gram (0.0037 mole) of sodium 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime and 0.63 g (0.037 mole) of 2-chloro-1-methylethoxybenzene were added to 50 ml of tetrahydrofuran, and the resulting mixture was heated under reflux for 5 hours with stirring. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 87%. n_D^{20} 1.5484.

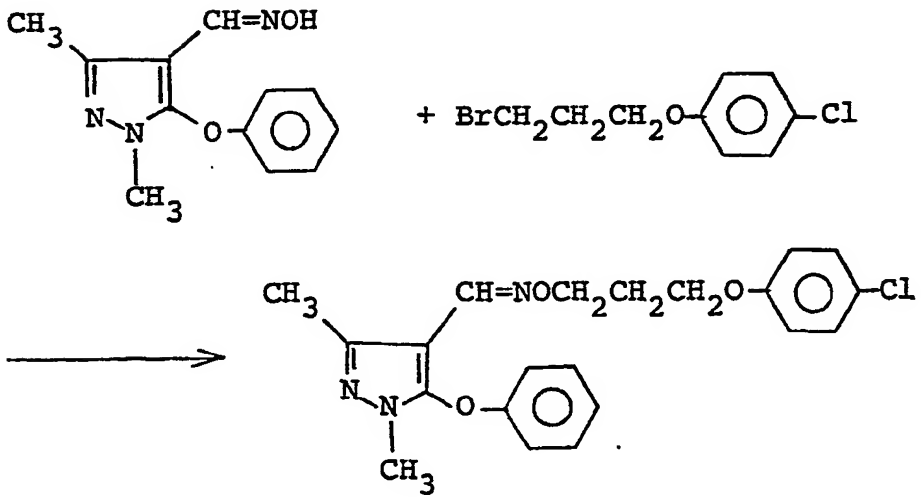
Example 49 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 0-2-(4-tert-butylphenylthio)ethyl ether (compound No. 753)



1.0 Gram (0.0030 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 0-2-bromoethyl ether, 0.5 g (0.0030 mole) of p-tert-butylbenzenethiol and 1.0 g (0.0072 mole) of potassium carbonate were added to 60 ml of acetonitrile, and the resulting mixture was heated under reflux for 5 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.1 g of the desired compound.

Yield 87%. n_D^{20} 1.5775.

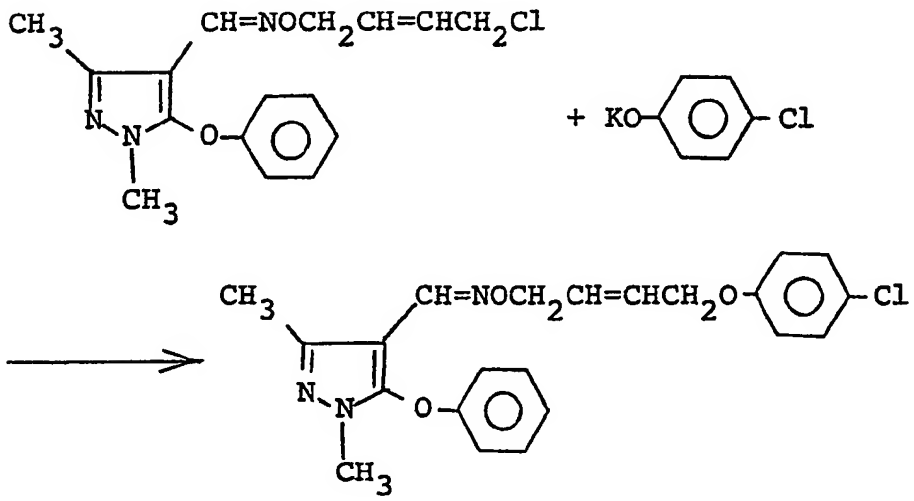
Example 50 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime 0-3-(4-chlorophenoxy)propyl ether (compound No. 761)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime and 0.3 g (0.0053 mole) of potassium hydroxide were added to 20 ml of dimethyl sulfoxide, and the resulting mixture was stirred for 1 hour. To this solution was added 1.07 g (0.0043 mole) of p-chloro-3-bromopropoxybenzene, and reaction was carried out at from 40° to 50°C for 4 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 76%. n_D^{20} 1.5746

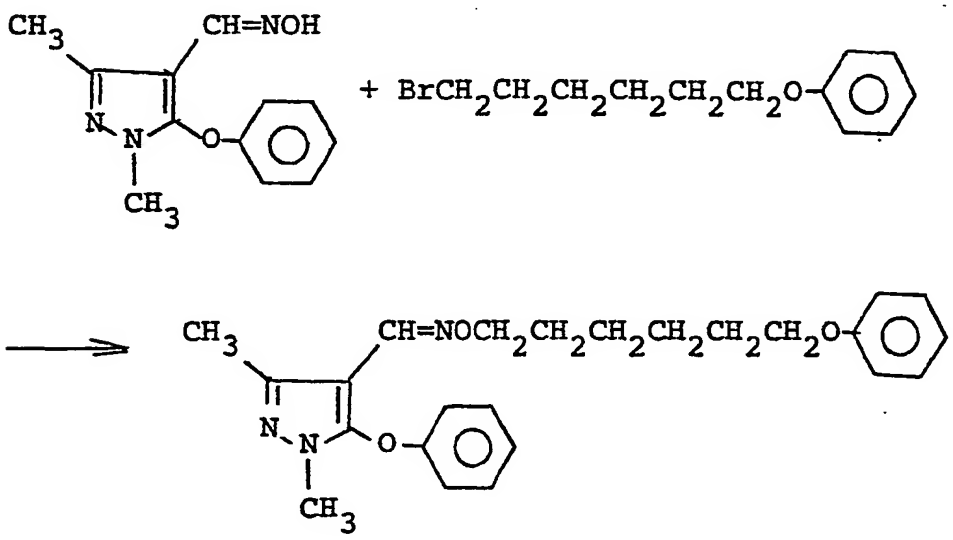
Example 51 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-(4-chlorophenoxy)-2-butenyl ether (compound No. 776)



1.0 Gram (0.0031 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-4-chloro-2-butenyl ether and 0.6 g (0.0036 mole) of the potassium salt of p-chlorophenol were added to 50 ml of tetrahydrofuran, and the resulting mixture was heated under reflux for 3 hours with stirring. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 93%. n_D^{20} 1.5712.

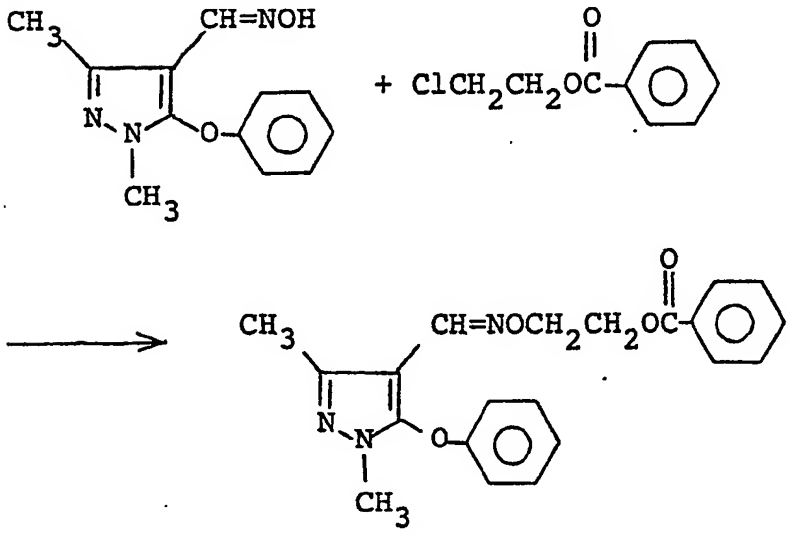
Example 52 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-6-phenoxyhexyl ether (compound No. 780)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 10 ml of dimethyl sulfoxide, and after adding 0.11 g (0.0045 mole) of sodium hydride at room temperature, the resulting solution was stirred for 30 minutes. To this solution was added 1.1 g (0.0043 mole) of 6-bromohexyloxybenzene, and reaction was carried out at from 50° to 60°C for 3 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.4 g of the desired compound.

Yield 80%. n_D^{20} 1.5583.

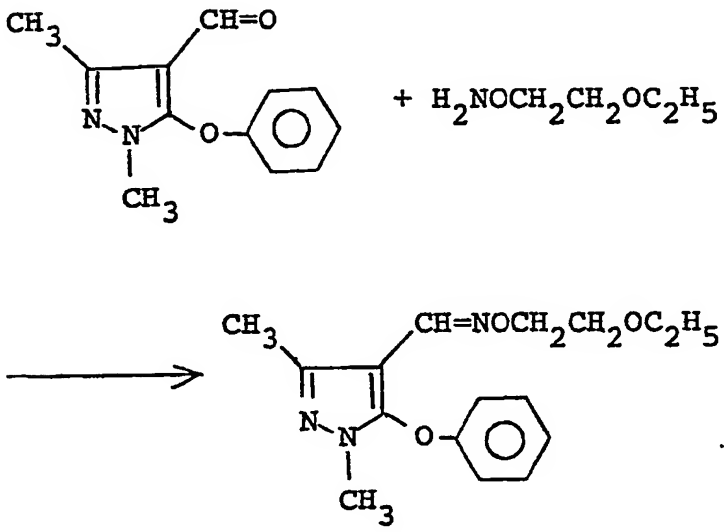
Example 53 2-[(1,3-Dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxy]ethyl benzoate (compound No. 787)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime and 0.3 g (0.0054 mole) of powdery potassium hydroxide were added to 20 ml of dimethyl sulfoxide, and the resulting mixture was stirred for 30 minutes. To this solution was added 0.8 g (0.0043 mole) of 2-chloroethyl benzoate, and reaction was carried out at from 40° to 50°C for 3 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.3 g of the desired compound.

Yield 86%. n_D^{20} 1.5632.

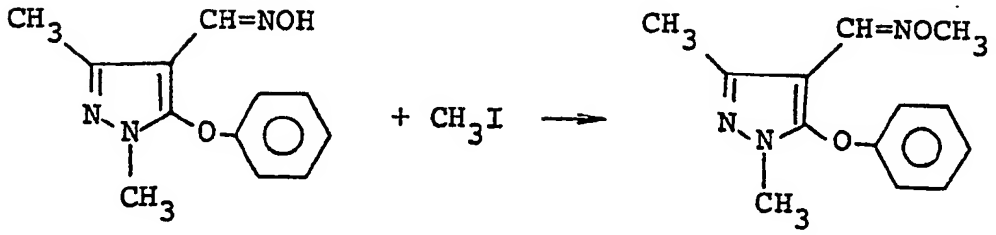
Example 54 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-2-ethoxyethyl ether (compound No. 789)



1.0 Gram (0.0046 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde was dissolved in 40 ml of ethanol, and 0.48 g (0.0046 mole) of O-(2-ethoxyethyl)hydroxylamine was added with stirring. Reaction was then carried out at room temperature for 3 hours. After completion of the reaction, water was added to the reaction solution which was then extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 86%. n_D^{20} 1.5407.

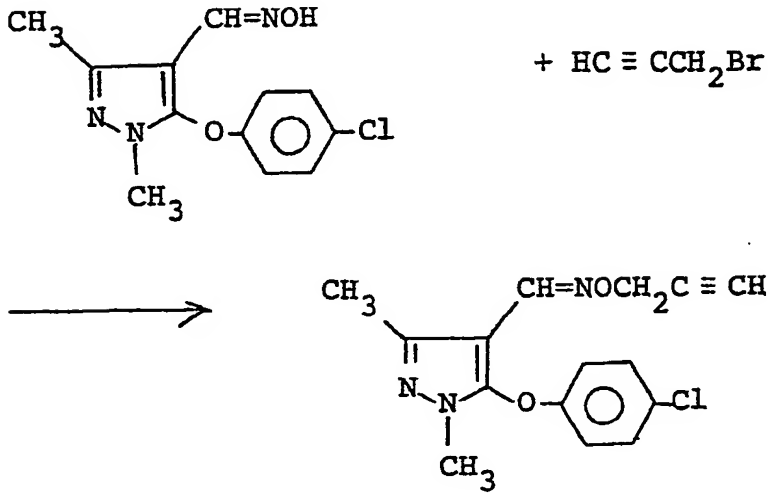
Example 55 1,3-Dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime O-methyl ether (compound No. 790)



1.0 Gram (0.0043 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dimethyl sulfoxide, and after adding 0.3 g (0.0053 mole) of powdery potassium hydroxide, the resulting mixture was stirred. To this reaction solution was added 1.0 g (0.0063 mole) of methyl iodide, and reaction was carried out at room temperature for 3 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 0.3 g of the desired compound.

Yield 76%. m.p. 70.2°C.

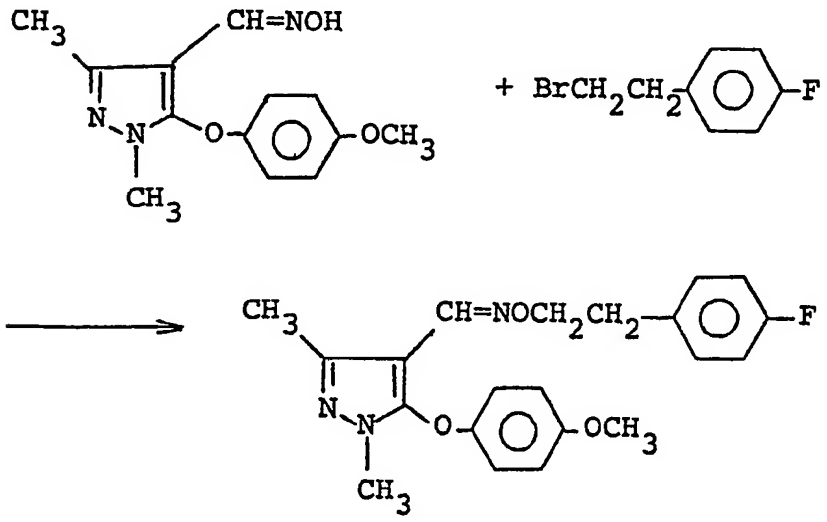
Example 56 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-2-propynyl ether (compound No. 795)



1.0 Gram (0.0033 mole) of 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime, 0.5 g (0.0042 mole) of propargyl bromide and 1.0 g (0.0072 mole) of potassium carbonate were added to 50 ml of acetone, and the resulting mixture was heated under reflux. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 0.9 g of the desired compound.

Yield 87%. n_D^{20} 1.5670.

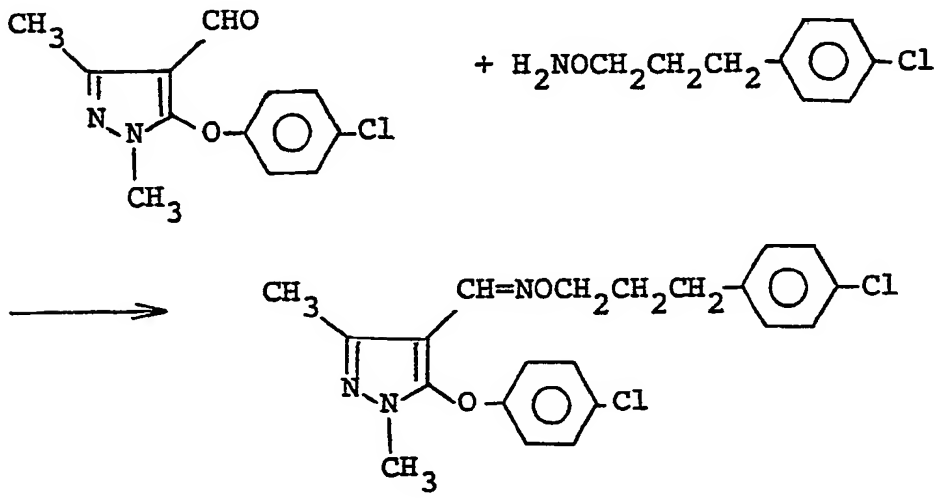
Example 57 5-(4-Methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-2-(4-fluorophenyl)-ethyl ether (compound No. 815)



1.0 Gram (0.0038 mole) of 5-(4-methoxyphenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime was dissolved in 20 ml of dioxane, and after adding 0.1 g (0.0042 mole) of sodium hydride, the resulting mixture was stirred. To this reaction solution was added 0.78 g (0.0038 mole) of 2-(4-fluorophenyl)ethyl bromide, and reaction was carried out at from 40° to 50°C for 3 hours. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.2 g of the desired compound.

Yield 82%. n_D^{20} 1.5588.

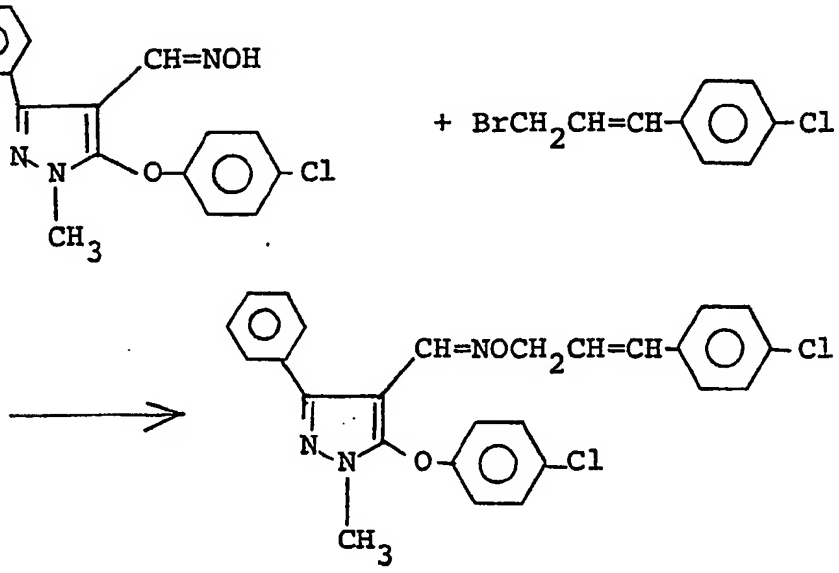
Example 58 5-(4-Chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde oxime O-3-(4-chlorophenyl)-propyl ether (compound No. 824)



1.0 Gram (0.004 mole) of 5-(4-chlorophenoxy)-1,3-dimethylpyrazole-4-carbaldehyde was dissolved in 30 ml of methanol, and 0.74 g (0.004 mole) of O-[3-(4-chlorophenyl)propyl]hydroxylamine was added at room temperature with stirring. Reaction was then carried out at from 40° to 50°C for 2 hours. Methanol was then removed by evaporation under reduced pressure, after which water was added to the residue and extraction was carried out with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.1 g of the desired compound.

Yield 66%. n_D^{20} 1.5751.

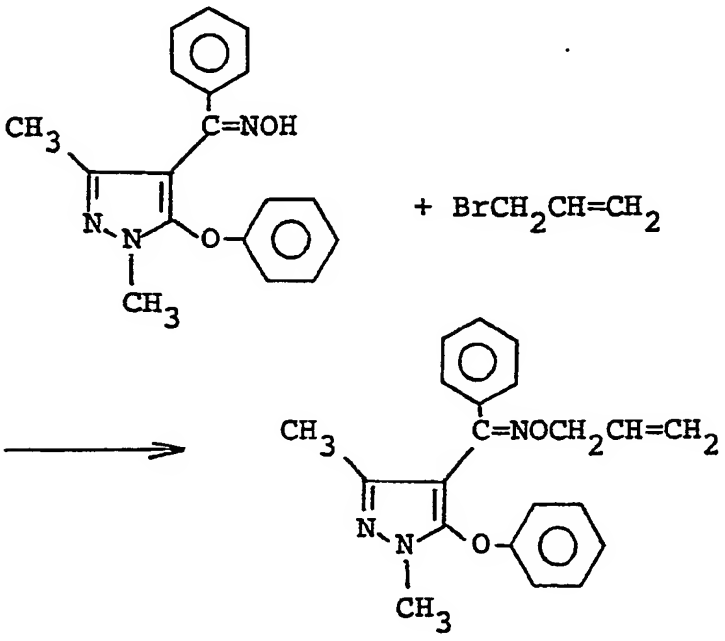
Example 59 5-(4-Chlorophenoxy)-1-methyl-3-phenylpyrazole-4-carbaldehyde oxime O-4-chlorocinnamyl ether (compound No. 846)



1.0 Gram (0.0030 mole) of 5-(4-chlorophenoxy)-1-methyl-3-phenylpyrazole-4-carbaldehyde oxime was reacted with 0.7 g (0.0030 mole) of p-chlorocinnamyl bromide and 0.2 g (0.005 mole) of sodium hydroxide at 30°C for 6 hours in 30 ml of dimethyl sulfoxide. After completion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 1.1 g of the desired compound.

Yield 76%. n_D^{20} 1.5980.

Example 60 1,3-Dimethyl-5-phenoxypyrazol-4-yl phenyl ketone oxime O-allyl ether (compound No. 857)

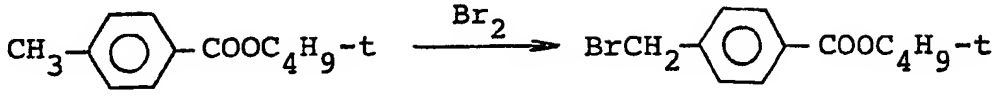


1.0 Gram (0.0033 mole) of 1,3-dimethyl-5-phenoxypyrazol-4-yl phenyl ketone oxime, 0.5 g (0.0041 mole) of allyl bromide and 1.0 g of potassium carbonate were added to 50 ml of acetone, and the resulting mixture was heated for 6 hours to carry out reaction. After compltion of the reaction, the reaction solution was poured into 200 ml of water and extracted with ethyl acetate. The ethyl acetate extract was washed with water and dried, and ethyl acetate was removed by evaporation under reduced pressure to obtain an oily product. This oily product was column-chromatographed on silica gel to obtain 0.9 g of the desired compound.

Yield 79%. n_D^{20} 1.5800.

Synthesis of starting materials

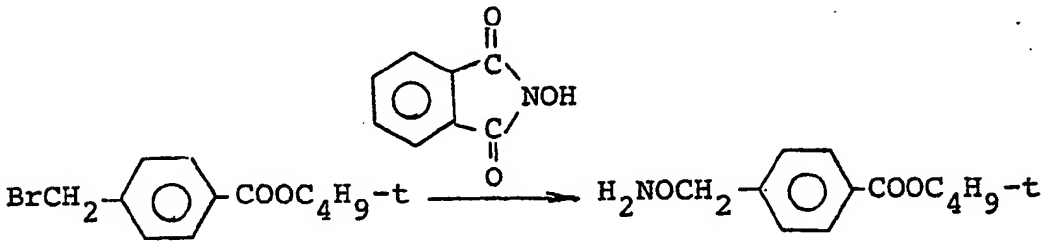
Synthetic example 1



13.2 Grams (0.006 mole) of tert-butyl 4-methylbenzoate, 0.3 g (0.0012 mole) of benzoyl peroxide and 6 g (0.006 mole) of sodium carbonate were suspended in 100 ml of carbon tetrachloride, and 9.6 g (0.06 mole) of bromine was added dropwise at 50°C over 30 minutes with stirring. After completion of the addition, reaction was continued for further 30 minutes. The reaction solution was then cooled and filtered to remove carbon tetrachloride-insoluble matters. Carbon tetrachloride was then removed by evaporation under reduced pressure to obtain 16.2 g of tert-butyl 4-bromomethylbenzoate as crystals.

Yield 90%. m.p. 53.4°C.

Synthetic example 2

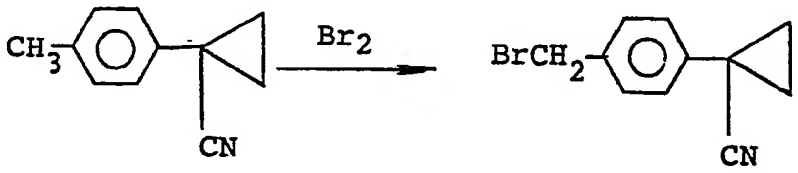


15.0 Grams (0.049 mole) of tert-butyl 4-bromomethylbenzoate, 8.2 g (0.05 mole) of N-hydroxyphthalimide and 3.0 g (0.054 mole) of potassium

hydroxide were added to 200 ml of dimethylformamide, and the resulting mixture was stirred at room temperature for 30 minutes and then at 50°C for 30 minutes. The reaction solution was cooled with ice water and filtered to obtain crystals. The crystals were dissolved in 50 ml of methylene chloride, and to this solution was slowly added dropwise 3 ml of isopropanol containing 0.5 g (0.05 mole) of hydrazine hydrate at room temperature. After completion of the addition, the reaction solution was heated under reflux for 2 hours. The reaction solution was cooled and filtered, and the filtrate was concentrated to obtain 11.0 g of tert-butyl 4-(aminoxymethyl)benzoate.

Yield 90%. $n_D^{15.6}$ 1.5296.

Synthetic example 3



3.0 Grams (0.02 mole) of 1-p-tolylcyclopropane-1-carbonitrile and 0.1 g (0.0004 mole) of benzoyl peroxide were dissolved in 50 ml of carbon tetrachloride, and 3.2 g of bromine was added dropwise over 30 minutes under reflux. After completion of the addition, reaction was continued for further 30 minutes. After cooling the reaction solution, carbon tetrachloride was removed by evaporation to obtain 4.4 g of 1-(4-bromomethylphenyl)cyclopropane-1-carbonitrile.

Yield 90%. Form of product: paste.

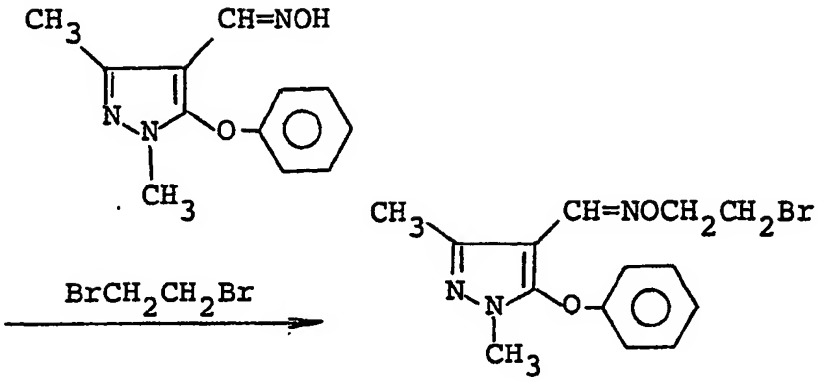
NMR:

δ (ppm) 1.15 - 1.40 (2H, m),

2.50 - 2.75 (2H, m),

4.45 (1H, s), 7.35 (4H, s)

Synthetic example 4



5.0 Grams (0.00216 mole) of 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde oxime and 41.0 g (0.218 mole) of 1,2-dibromethane were dissolved in 100 ml of dimethyl sulfoxide, and after adding 14.4 g (0.219 mole) of 85% powdery potassium hydroxide with ice-cooling, the resulting solution was stirred for 30 minutes. After completion of the reaction, the reaction solution was poured into 300 ml of water, extracted with three 80-ml portions of ether and washed with 300 ml of water. The ether extract was dried over anhydrous sodium sulfate, and ether was removed by evaporation. The residue was dry column-chromatographed on silica gel to obtain 5.2 g of 1,3-dimethyl-5- phenoxypyrazol-4-carbaldehyde oxime 0-2-bromoethyl ether.

Yield 71.2%. $n_D^{23.8}$ 1.5721.

The present invention provides a technique for exterminating or controlling injurious insects and mites using the physiological activity of the compounds of the present invention. In one of the embodiments of the invention, the compounds are directly applied as such to the objects to be protected or to the pests to be controlled (undiluted spray). For instance, the compounds of the present invention in the form of a liquid of 95% or higher purity can be sprayed from aeroplanes to form a fog of extremely fine liquid particles.

The compounds of the present invention can also be used to treat ponds and pools in which the larvae of the insects live or treat environmental water or irrigative water grown with hosts for the larvae to render the living environment or feed (hosts) toxic to the larvae.

As is customary in the art, however, in order to exterminate or control injurious insects and mites using the physiological activity of the compounds of the present invention, the compounds are applied in most cases in a form suitable for use, for example, as supported on or diluted with inert carriers and if necessary, mixed with auxiliary agents.

General suggestions regarding the formulation of insecticidal compositions with the compounds of the present invention will be described below.

The compounds of the present invention are mixed with a suitable proportion of suitable inert carriers together with auxiliary agents if necessary to allow the

compounds to dissolve, disperse, suspend, mix, impregnate, adsorb or adhere, and thus they are formed into suitable preparations such as for example solutions, suspensions, emulsifiable concentrates, oil sprays, wettable powders, dusts, granules, tablets, pellets, pastes, aerosols, etc.

The inert carriers used in the formulation may be either solid or liquid. As examples of the solid carriers, there may be mentioned vegetable powders such as soybean flour, cereal flour, wood flour, bark flour, saw dust, powdered tobacco stalk, powdered walnut shell, bran, powdered cellulose, and extraction residues of vegetables; fibrous materials such as paper, corrugated paperboard, and waste cloth; synthetic polymers such as powdered synthetic resins; inorganic or mineral products such as clays (e.g. Kaolin, bentonite, and acid clay), talcs (e.g. talc and pyrophylite), siliceous substances [e.g. diatomaceous earth, silica sand, mica, and "white carbon" (highly dispersed synthetic silicon dioxide, also called finely divided hydrated silica or hydrated silicon dioxide, some commercial products containing calcium silicate as major constituent)], activated carbon, powdered sulfur, pumice, calcined diatomaceous earth, ground brick, fly ash, sand, calcium carbonate, and calcium phosphate; chemical fertilizers such as ammonium sulfate, ammonium nitrate, urea, and ammonium chloride; and farmyard manure. These materials are used alone or in combination. Materials usable as liquid carriers are selected from those which will dissolve the active ingredients and those which do not

dissolve them, but can disperse them with the aid of adjuvants. For example, the following materials can be used alone or in combination: Water, alcohols (e.g. methanol, ethanol, isopropanol, butanol, ethylene glycol), ketones (e.g. acetone, methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone and cyclohexanone), ethers (e.g. ethyl ether, dioxane, cellosolves, dipropyl ether and tetrahydrofuran), aliphatic hydrocarbons (e.g. gasoline and mineral oils), aromatic hydrocarbons (e.g. benzene, toluene, xylene, solvent naphtha and alkylnaphthalenes), halohydrocarbons (e.g.dichloroethane, chlorinated benzenes, chloroform and carbon tetrachloride), esters (e.g. ethyl acetate, dibutyl phthalate, diisopropyl phthalate and dioctyl phthalate), acid amides (e.g. dimethylformamide, diethylformamide and dimethylacetamide), nitriles (e.g. acetonitrile), and dimethyl sulfoxide.

Gaseous carriers include freons and other aerosol propellants which are a gas under normal conditions.

The adjuvants, which are mentioned below, are used according to individual purposes. In some cases, they are used in combination with one another. In some other cases, no adjuvant is used at all.

For the purpose of emulsification, dispersion, solubilization and/or wetting of the active ingredients, there are used surface active agents such as for example polyoxyethylene alkylaryl ethers, polyoxyethylene alkyl ethers, polyoxyethylene higher fatty acid esters, polyoxyethylene resinates, polyoxyethylene sorbitan

monolaurate, polyoxyethylene sorbitan monooleate, alkylarylsulfonates, naphthalenesulfonic acid condensation products, ligninsulfonates and higher alcohol sulfate esters.

For the purpose of stabilizing the dispersion, tackification and/or agglomeration of the active ingredients, there may be used for example casein, gelatin, starch, alginic acid, methylcellulose, carboxymethylcellulose, gum arabic, polyvinyl alcohol, turpentine oil, rice bran oil, bentonite and ligninsulfonates.

For the purpose of improving the flow property of the solid compositions, it is recommendable to use waxes, stearates or alkyl phosphates.

As peptizers for dispersible compositions, it is also recommendable to use naphthalenesulfonic acid condensation products and polyphosphates.

It is also possible to add a defoamer such as for example a silicone oil.

The content of the active ingredient may be adjusted as occasion demands. For the preparation of powdered or granulated products, the content is usually from 0.5 to 20% by weight, and for the preparation of emulsifiable concentrates, suspension concentrates or wettable powders, it is preferably from 0.1 to 50% by weight.

For controlling various insects, mites and fungi, inhibiting their growth and protecting useful plants from damage caused by these insects, mites and

fungi, the compositions of the present invention for use in agriculture and horticulture are applied in insecticidally, acaricidally or fungicidally effective amounts. In applying the present compositions, they are applied, as such or after properly diluted with or suspended in water or other suitable medium, to soil or the foliage of crops to be protected from the attack of insects, mites and fungi.

The amount of the active ingredient used depends upon various factors such as for example the purpose of application, growth state of crops, weather, environmental conditions, the form of the composition, the mode of application, the type of fields to be treated, and the like.

In applying the present fungicidal compositions alone, the dosage of the present active ingredient is preferably selected from a range of from 0.1 to 500 g per 10 ares.

Furthermore, the present compounds can be applied in the form of mixed formulations with other fungicides, insecticides, fertilizers and plant growth regulators, as far as such agents can be used in combination with the present compounds.

Examples of pesticides usable in admixture with the insecticide of the present invention will be shown below:

O,O-dimethyl O-(4-nitro-3-methylphenyl)-thiophosphate (Phenitrothion)

O,O-dimethyl O-(3-methyl-4-methylthiophenyl)-thiophosphate (Baycid)

O,O-dimethyl S-(carbethoxyphenylmethyl)-dithiophosphate (Elsan)

O,O-diethyl O-(2-isopropyl-4-methylpyrimidyl-6)-thiophosphate (Diazinon)

O,O-dimethyl 2,2,2-trichloro-1-hydroxyethyl-phosphate (Dipterex)

O-ethyl O-p-cyanophenyl phenylphosphonothioate (Surecide)

O-ethyl O-p-nitrophenyl phenylthiophosphonate (EPN)

O,O-dipropyl O-4-methylthiophenylphosphate (Propaphos)

O,O-dimethyl S-phthalimidomethyl dithiophosphate (Imidan)

O,O-dimethyl O-dichlorovinyl phosphate (DDVP)

O,O-dimethyl S-(N-methylcarbamoylmethyl)-dithiophosphate (Dimethoate)

O,O-dimethyl S-(1,2-dicarbethoxyethyl)-dithiophosphate (Malathon)

1-Naphthyl N-methylcarbamate (NAC)

m-Tolyl N-methylcarbamate (MTMC)

2-Isopropoxyphenyl N-methylcarbamate (PHC)

Ethyl N-(diethyl-dithiophosphorylacetyl)-N-methylcarbamate (Mecarbam)

3,4-Xylyl N-methylcarbamate (MPMC)

2-s-Butylphenyl N-methylcarbamate (BPMC)

2-Isopropylphenyl N-methylcarbamate (MIPC)

2-Chlorophenyl N-methylcarbamate (CPMC)

3,5-Xylyl N-methylcarbamate (XMC)

2-(1,3-Dioxolan-2-)phenyl N-methylcarbamate (Dioxacarb)

3-tert-Butylphenyl N-methylcarbamate (Terbam)

4-Diallylamino-3,5-dimethylphenyl N-methylcarbamate (APC)

S-methyl-N-(methylcarbamoyloxy) thioacetoimidate (Methomil)

N-(2-methyl-4-chlorophenyl)-N,N-dimethylformamidine hydrochloride (Chlorophenamidine)

1,3-Bis(carbamoylthio)-2-(N,N-dimethylamino)-propane hydrochloride (Cartap)

Diisopropyl-1,3-dithiolan-2-ylidene malonate (Isoprothiolan)

N-[[(4-chlorophenyl)amino]carbonyl]-2,6-difluorobenzamide (Diflubenzuron)

O,O-Dimethyl-S-[2-(isopropylthio)ethyl]-phosphorodithioate (Isothioate)

O,O-Diethyl-S-[2-(ethylthio)ethyl]-phosphorodithioate (Disulfoton)

2,3-Dihydro-2,2-dimethylbenzofuran-7-yl methylcarbamate (Carbofuran)

O-Ethyl S,S-diphenyl phosphorodithioate (Edibenfos)

N-(trichloromethylthio)cyclohex-4-ene-1,2-dicarboxamide (Captan)

2,4,5,6-Tetrachloro-1,3-isophthalonitril (Chlorothalonil)

N-(1,1,2,2-tetrachloroethylthio)cyclohex-4-ene-1,2-dicarboxamide (Captafol)

Dimethyl 4,4-o-phenylene bis(3-thioallophanate) (Thiophanate methyl)

Methyl 3-(butylcarbamoyl)-3H-benzimidazol-2-ylcarbamate (Benomyl)

Zinc ethylenebis(dithiocarbamate)(polymeric) (Zineb)

Manganese ethylenebis(dithiocarbamate)(polymeric) (Maneb)

In order to demonstrate the effectiveness of the present compounds, some test examples and formulation examples will be shown below, but the present invention is not limited to these examples only.

Test example 1 Fungicidal activity against the powdery mildow of barley (Erysiphe graminis f. sp. hordei)

Barley seedlings at 2-leaf stage were sprayed with test compound (200 ppm) one day after inoculation with conidia of Erysiphe graminis f. sp. hordei. The seedlings were kept in a constant-temperature room at 25°C for one week and the percentage of the infected area per leaf was examined. The fungicidal activity was judged based on the following criterion in comparison with the untreated plot.

The results are shown in Table 2.

A : Control of disease 100 - 95%

B : Control of disease 94 - 80%

C : Control of disease 79 - 60%

D : Control of disease 59 - 0%

Table 2

Compound No.	Fungicidal activity	Compound No.	Fungicidal activity	Compound No.	Fungicidal activity
4	B	55	A	97	C
9	C	56	A	98	A
16	B	57	C	102	A
17	A	58	C	103	C
18	B	59	A	105	A
19	A	60	A	109	A
20	B	66	A	110	B
21	A	67	A	111	A
22	A	68	A	112	A
23	A	69	A	113	A
24	A	71	B	114	A
25	A	73	A	118	B
26	A	74	A	119	C
27	A	85	A	120	B
33	A	86	A	123	A
34	A	87	A	124	B
35	A	88	A	133	A
36	A	89	A	134	B
41	A	90	A	136	A
42	A	91	A	140	B
50	A	92	A	142	C
51	A	93	B	144	C
52	B	94	A	145	A
53	A	95	B	153	A
54	A	96	C	154	A

- Con't -

Table 2 (Cont'd)

155	A	212	A	249	C
156	A	213	A	250	A
157	A	216	A	251	B
158	A	217	B	252	A
159	A	219	C	253	A
160	A	220	A	254	A
161	B	221	A	255	A
167	A	222	C	257	B
181	C	228	B	258	B
186	B	229	A	262	B
188	A	230	A	263	A
190	C	231	A	264	A
193	A	232	A	265	A
194	A	234	A	266	A
195	A	235	A	267	A
197	A	236	C	268	A
198	A	237	A	269	B
199	A	238	C	270	B
200	A	239	A	281	B
201	A	240	A	282	C
202	A	241	A	283	A
203	A	242	A	300	C
204	B	243	A	302	B
205	A	245	A	303	B
206	C	246	B	304	B
207	C	248	A	305	B

- Cont'd -

Table 2 (Cont'd)

306	A	351	A	391	A
309	B	352	B	392	A
311	C	353	A	393	A
312	B	356	A	394	A
315	A	357	A	395	A
316	A	358	A	396	A
321	A	363	A	397	A
323	A	364	A	398	A
324	C	365	A	399	A
328	B	366	A	400	A
329	A	369	A	401	A
330	A	370	A	402	A
331	A	371	C	403	A
332	A	372	A	404	A
333	A	373	C	405	A
334	A	374	A	406	A
336	B	375	A	407	A
337	B	382	A	409	A
340	A	383	A	421	A
342	A	384	A	422	A
343	A	385	A	424	A
344	A	386	A	427	A
346	A	387	A	428	A
347	A	388	C	429	A
349	B	389	A	431	A
350	A	390	A	432	B

- Cont'd -

Table 2 (Cont'd)

433	A	470	B	496	A
434	A	471	A	497	A
435	B	472	A	498	A
436	A	473	A	499	A
437	A	474	A	501	A
438	A	475	B	502	A
439	A	476	A	503	A
440	A	477	A	504	A
441	A	478	B	505	A
443	A	479	A	506	A
444	A	480	A	507	A
445	A	481	A	508	A
446	A	482	A	518	C
447	A	483	A	522	B
448	A	484	A	523	B
449	A	485	A	524	B
450	A	486	A	527	A
451	A	487	A	528	A
452	A	488	B	529	B
453	A	489	B	530	B
454	A	490	B	532	A
455	A	491	C	533	A
465	A	492	B	534	C
466	A	493	A	535	B
468	A	494	A	536	A
469	A	495	A	537	B

- Cont'd -

Table 2 (Cont'd)

538	A	574	B	612	A
541	A	576	A	613	A
545	A	578	B	614	A
546	A	579	B	615	A
547	A	580	B	616	A
548	A	581	C	617	A
549	B	584	B	618	A
550	C	586	C	619	A
551	B	587	B	620	A
552	C	589	A	621	A
553	A	591	B	622	A
554	C	592	A	623	A
555	C	593	B	624	A
556	B	594	B	625	A
557	A	595	C	626	A
562	A	596	C	627	B
563	A	597	C	628	B
565	A	598	C	629	A
566	A	601	C	630	A
567	A	602	A	631	A
568	A	603	A	636	A
569	B	604	A	637	A
570	A	608	A	638	A
571	A	609	A	639	A
572	B	610	A	640	A
573	B	611	A	641	B

- Cont'd -

Table 2 (Cont'd)

642	C	677	A	727	A
643	A	678	A	729	A
644	B	680	A	730	B
645	A	682	A	731	B
646	A	683	A	732	A
648	A	684	A	733	A
649	A	691	B	737	A
650	B	692	B	739	C
652	C	693	A	740	A
653	B	694	A	741	A
654	B	695	A	746	B
655	A	696	B	751	B
656	B	697	B	753	B
657	B	700	C	754	A
658	A	701	A	755	A
659	B	702	B	757	A
660	A	707	B	758	A
661	B	708	A	759	A
662	B	713	A	763	B
663	A	715	A	766	A
667	C	716	B	767	A
668	A	718	C	768	A
670	A	719	A	769	A
672	B	720	B	772	B
675	B	724	A	773	A
676	B	726	B	775	B

- Cont'd -

Table 2 (Cont'd)

783	B	823	A	841	B
784	B	824	A	842	A
795	A	825	A	843	A
796	B	827	B	844	A
803	A	828	C	848	A
804	C	829	A	849	A
805	C	831	C	850	A
816	A	833	B	851	A
817	A	834	A	852	B
818	A	835	B	853	A
819	A	836	A	854	C
821	B	839	A	855	A
822	B	840	B		

Test example 2 Fungicidal activity against the crown rust of oat (Puccinia coronata f.sp. avenae)

Oat seedling at 8-leaf stage were sprayed with test compound (200 ppm) one day after inoculation with uredospores of Puccinia coronata f.sp. avenae. The seedlings were kept in a constant-temperature room at 25°C for ten days and the percentage of the infected area per leaf was examined. The fungicidal activity was judged according to the same criterion as in Test example 1.

The results are shown in Table 3.

Table 3

Compound No.	Fungicidal activity	Compound No.	Fungicidal activity	Compound No.	Fungicidal activity
14	B	60	A	111	A
18	C	66	A	112	A
19	C	67	A	113	A
21	C	68	A	114	A
22	B	69	A	133	A
23	B	71	A	134	A
24	B	73	A	135	B
25	B	74	A	136	A
27	A	85	A	138	A
33	A	86	A	139	A
34	A	87	A	140	A
35	A	88	B	142	A
36	A	89	A	143	A
41	A	90	A	144	A
42	A	91	A	145	A
50	A	92	C	153	A
51	A	93	B	154	A
52	A	94	B	155	A
53	A	95	A	156	A
54	A	96	A	157	A
55	A	97	C	158	A
56	A	98	A	159	B
57	A	105	A	160	B
58	A	109	A	161	A
59	A	110	A	186	A

- Con't -

Table 3 (Cont'd)

188	A	241	A	328	A
193	A	242	B	329	A
194	A	243	A	330	A
195	A	245	A	331	A
198	A	246	A	332	A
199	A	248	C	333	A
200	A	250	A	337	A
201	B	251	A	340	B
202	C	254	B	342	A
203	A	257	A	343	A
204	B	258	A	344	A
205	B	263	A	345	B
212	A	264	A	346	A
213	C	265	A	347	A
217	C	266	B	349	A
220	B	267	B	350	A
221	A	268	B	351	B
228	B	283	B	353	A
229	A	303	C	355	B
230	A	305	B	356	A
231	A	306	A	357	A
234	A	309	C	358	A
237	A	312	A	363	A
238	B	315	A	364	A
239	A	316	A	366	A
240	A	323	B	369	A

- Cont'd -

Table 3 (Cont'd)

370	A	402	A	446	C
371	A	403	A	447	A
372	A	404	A	448	A
373	A	405	A	449	A
374	A	406	A	450	A
375	A	407	A	451	A
381	C	409	A	452	A
382	A	421	A	453	A
383	A	422	A	454	A
384	A	427	C	455	A
385	A	428	A	465	A
386	A	429	A	468	A
387	B	431	A	469	A
388	C	433	A	470	A
390	A	434	A	471	A
391	A	435	B	472	A
392	A	436	A	473	A
393	A	437	A	474	A
394	A	438	C	475	A
395	A	439	A	476	B
396	A	440	A	477	A
397	A	441	A	478	A
398	A	442	A	479	A
399	A	443	B	480	A
400	A	444	A	481	C
401	A	445	B	482	A

- Cont'd -

Table 3 (Cont'd)

483	A	523	A	557	A
484	A	524	A	558	C
485	A	525	A	559	C
486	A	527	C	560	B
487	A	528	A	561	A
488	A	529	A	562	B
489	A	530	A	563	A
490	A	531	A	565	A
491	A	532	A	566	A
492	A	533	A	567	A
493	A	534	A	568	A
494	A	535	A	569	A
495	A	536	A	570	A
496	A	537	A	571	A
497	A	538	A	572	A
498	A	544	B	573	C
499	A	545	A	574	B
500	C	546	A	576	A
501	A	548	A	577	A
502	A	550	C	578	A
503	A	551	A	579	A
504	A	552	C	580	A
505	A	553	B	585	C
506	A	554	A	586	A
507	A	555	A	587	A
508	A	556	A	589	A

- Cont'd -

Table 3 (Cont'd)

590	A	621	A	651	B
591	A	622	A	652	A
592	A	623	A	653	B
593	A	624	A	654	A
594	A	625	A	655	A
595	A	626	A	656	A
596	B	627	A	657	A
599	B	628	A	658	A
602	A	629	A	659	B
603	A	630	A	660	A
604	A	631	A	661	A
606	C	636	A	662	A
607	A	637	A	663	A
608	A	638	A	667	C
609	A	639	A	668	A
610	A	640	A	669	B
611	A	641	A	670	B
612	A	642	A	672	B
613	A	643	A	674	B
614	A	644	A	675	A
615	A	645	A	677	A
616	A	646	A	678	A
617	A	647	A	679	B
618	A	648	A	680	A
619	A	649	A	682	A
620	A	650	A	683	A

- Cont'd -

Table 3 (Cont'd)

684	A	727	A	784	B
685	A	729	A	794	C
690	C	730	A	796	A
691	C	731	A	804	A
692	A	732	A	812	B
693	A	733	A	813	A
694	A	737	B	814	B
695	A	746	B	815	B
696	A	751	B	817	C
697	A	755	A	821	A
699	A	757	B	822	C
701	A	758	A	823	A
706	B	759	A	824	A
709	A	763	A	825	A
710	A	764	B	829	A
711	A	766	A	830	C
712	A	767	A	831	A
713	B	768	A	832	C
715	B	769	A	833	A
717	C	770	B	834	A
719	A	772	A	835	A
720	C	773	A	838	A
723	B	780	B	842	A
724	A	781	C	843	A
725	A	782	A	844	A
726	A	783	B	848	A

- Cont'd -

Table 3 (Cont'd)

849	B	851	A	853	A
850	A	852	B	854	A

Test example 3 Fungicidal activity against the downy mildew of cucumber (Pseudoperonospora cubensis)

Cucumber plants at 2-leaf stage were sprayed with test compound (200 ppm) one day before inoculation with zoospores of Psudopernospora cubensis. After the plants were kept in a humid room at 25°C one day and then in a greenhouse for six days, the degree of infection per leaf was examined and the fungicidal activity was judged according to the same criterion as in Test example 1.

The results are shown in Table 4.

Table 4

Compound No.	Fungicidal activity	Compound No.	Fungicidal activity	Compound No.	Fungicidal activity
4	B	51	B	90	A
9	A	52	B	91	A
10	B	53	C	92	A
12	C	54	A	93	A
13	B	55	A	94	A
16	C	56	A	95	A
17	A	57	A	96	A
18	C	58	C	97	A
19	A	59	C	98	A
20	B	60	A	99	A
21	A	65	C	100	A
22	A	66	A	101	A
23	A	67	A	102	A
24	A	68	A	103	B
25	A	69	B	104	C
26	A	73	C	105	B
27	A	74	A	109	B
33	A	75	B	110	A
34	A	77	B	111	A
36	A	78	A	112	B
41	A	79	C	113	A
42	A	85	A	114	A
45	A	86	B	115	A
47	C	87	A	116	A
50	A	88	C	117	B

- Con't -

Table 4 (Cont'd)

118	B	179	A	228	B
121	C	180	A	229	B
122	A	181	C	230	B
123	B	182	A	231	C
130	A	183	B	232	B
131	A	186	C	234	A
133	C	188	A	237	A
136	A	192	A	239	C
137	B	193	A	240	A
138	B	194	A	242	C
139	A	195	B	243	A
140	A	196	B	245	A
141	C	197	A	246	B
145	B	198	A	251	C
147	A	199	A	252	B
153	B	200	A	253	A
154	A	201	B	254	A
155	A	202	B	255	B
156	A	203	A	256	B
159	C	204	A	257	C
160	B	205	A	258	C
161	A	212	A	262	C
162	A	213	A	263	C
171	C	216	C	264	C
173	A	220	B	265	A
178	A	221	A	266	B

- Cont'd -

Table 4 (Cont'd)

267	C	336	A	376	B
269	B	337	B	377	B
270	C	342	A	378	C
284	C	343	C	383	A
288	C	344	B	385	A
292	A	346	A	386	B
293	B	350	B	387	B
296	B	351	A	388	A
297	A	352	B	389	B
298	C	353	A	390	A
299	A	354	C	391	A
302	A	355	C	392	A
303	C	356	A	393	A
304	A	357	A	394	A
305	B	358	A	395	A
306	B	363	A	396	A
312	B	364	A	397	A
316	C	365	A	398	A
321	A	366	A	399	A
326	B	369	A	400	A
328	B	370	A	401	A
329	B	371	B	402	A
330	B	372	A	403	A
331	A	373	A	404	A
332	A	374	A	405	A
333	A	375	A	406	A

- Cont'd -

Table 4 (Cont'd)

407	A	452	A	492	C
409	A	453	A	493	B
420	B	454	A	496	A
421	A	455	A	497	A
424	A	465	A	498	C
428	B	468	A	499	C
429	A	469	A	502	C
431	A	471	A	503	C
432	B	473	C	504	A
433	B	474	C	505	C
434	B	476	B	506	A
436	A	477	A	507	A
437	A	478	A	508	A
438	A	479	B	511	A
439	A	480	A	512	A
440	A	481	A	513	A
441	A	482	A	514	A
442	B	483	B	515	A
444	A	484	A	516	B
445	A	485	A	518	C
446	B	486	A	523	A
447	A	487	A	524	A
448	B	488	A	525	A
449	A	489	A	527	B
450	A	490	A	528	A
451	A	491	B	529	B

- Cont'd -

Table 4 (Cont'd)

531	C	572	A	609	A
532	A	574	B	610	A
533	A	576	A	611	A
534	A	577	A	612	A
535	A	578	C	613	A
536	A	579	B	614	A
537	A	584	B	615	A
538	A	585	B	616	A
541	B	586	A	617	A
544	A	588	C	618	A
546	A	589	A	619	A
548	A	590	A	620	A
551	A	591	A	621	A
553	C	592	A	622	B
554	C	593	A	623	A
555	B	594	A	624	A
556	C	595	A	625	A
557	B	596	C	626	A
562	A	597	C	627	A
563	A	598	C	628	A
565	A	599	B	629	A
566	A	602	A	630	A
567	B	603	A	631	C
568	B	604	A	632	A
569	A	605	A	633	A
570	A	608	A	636	A

- Cont'd -

Table 4 (Cont'd)

637	A	663	A	699	C
638	A	668	A	700	C
639	A	669	A	701	A
640	A	670	A	702	A
641	A	673	B	705	A
642	A	674	A	706	C
643	C	675	A	709	A
644	B	676	A	713	A
645	A	677	A	714	B
646	A	678	A	715	B
647	A	680	A	716	B
648	A	681	A	717	A
649	A	682	A	719	B
650	A	683	A	720	A
651	A	684	A	725	B
652	A	685	A	726	B
653	A	686	A	727	B
654	A	690	B	728	B
655	A	691	A	729	A
656	A	692	A	730	A
657	A	693	A	731	B
658	A	694	A	732	A
659	A	695	A	733	A
660	A	696	A	737	C
661	A	697	A	739	B
662	A	698	A	740	B

- Cont'd -

Table 4 (Cont'd)

741	A	780	A	836	A
742	A	782	B	837	B
746	A	783	A	838	C
751	A	784	A	839	C
752	A	787	B	840	C
754	B	789	B	841	C
755	A	804	A	842	A
756	A	812	A	843	A
757	A	813	A	844	A
758	A	814	A	845	B
759	A	815	C	848	A
761	C	817	C	849	A
763	C	820	C	850	A
764	A	821	A	851	A
765	B	822	A	852	A
766	A	823	A	853	A
767	A	824	A	854	A
768	A	825	A	855	A
769	A	826	B		
770	B	827	B		
772	A	828	B		
773	A	829	A		
774	A	831	A		
775	A	833	A		
776	A	834	A		
777	A	835	A		

Test example 4 Insecticidal activity against the brown planthopper (Nilaparvata lugens)

Rice seedlings were dipped into the aqueous emulsion of the compound at 200 ppm for 30 seconds. After air-drying, the seedling were placed in a glass tube, and the 3rd instar nymphs were inoculated on the plants. On 8th day after treatment, the corrected mortality was caluculated and the insecticidal activity was judged based on the following criterion.

The results are shown in Table 5.

A: Reviced Mortality 100 - 90%

B: " 89 - 80%

C: " 79 - 50%

Table 5

Compound No.	Insecticidal activity	Compound No.	Insecticidal activity	Compound No.	Insecticidal activity
16	A	71	A	123	A
17	A	72	B	124	A
19	A	73	A	125	A
20	A	74	A	133	A
21	A	85	A	134	A
22	A	86	A	135	A
23	A	87	A	136	A
27	A	88	A	140	A
32	A	89	A	154	A
33	A	90	A	155	A
34	A	91	A	157	A
35	A	92	A	158	A
36	A	95	A	159	A
40	C	96	C	160	A
41	A	102	A	161	A
42	A	103	A	166	A
54	A	104	A	193	A
55	A	105	A	194	A
56	B	109	A	195	A
60	A	110	A	198	A
65	C	111	A	199	B
66	A	112	A	200	A
67	A	113	A	203	A
68	A	114	A	204	A
69	A	122	A	211	C

- Con't -

Table 5 (Cont'd)

212	A	283	A	345	A
214	B	302	A	346	C
217	C	303	B	347	A
221	A	304	C	349	A
229	A	305	C	350	A
230	A	306	A	351	A
231	A	310	A	352	A
232	A	311	A	353	A
234	A	314	C	355	A
235	B	315	A	356	A
236	A	316	A	357	A
237	A	321	A	358	A
239	A	328	A	363	A
240	A	329	A	364	A
241	A	330	A	365	A
242	A	331	A	366	A
248	A	332	A	369	A
250	A	333	A	370	A
255	A	334	A	371	A
257	A	336	A	372	A
258	A	337	A	373	A
260	C	339	C	374	A
266	A	340	A	375	A
267	A	342	A	388	A
268	C	343	A	389	A
269	C	344	A	390	A

- Cont'd -

Table 5 (Cont'd)

391	A	435	B	471	A
392	A	436	A	472	A
394	A	437	A	473	A
395	A	438	A	474	A
396	A	439	A	475	A
397	A	440	A	476	A
398	A	441	B	477	A
399	A	442	A	479	A
400	B	443	A	480	A
401	A	444	B	481	A
402	A	445	C	482	A
403	A	446	B	483	A
404	A	447	A	484	A
405	A	448	A	485	A
406	A	449	A	486	A
407	A	450	A	487	A
409	A	451	A	488	A
421	A	452	A	489	A
422	A	453	A	499	A
424	A	454	A	500	B
427	A	465	A	501	A
428	A	466	A	502	A
429	A	467	A	503	A
431	A	468	A	504	A
433	A	469	A	505	A
434	A	470	A	506	A

- Cont'd -

Table 5 (Cont'd)

507	A	551	A	581	A
508	A	552	A	584	B
516	C	553	A	585	A
517A	A	554	A	586	A
518	A	555	A	587	A
523	A	556	A	588	B
524	A	557	A	589	B
525	A	562	A	594	B
527	A	563	A	595	A
528	A	564	A	602	A
529	A	565	A	603	A
531	A	566	A	604	A
532	A	567	A	608	A
533	A	568	A	609	A
534	A	569	A	610	A
535	A	570	A	611	A
536	A	571	A	612	A
537	A	572	A	613	A
538	A	573	A	614	A
541	A	574	A	615	A
544	A	575	A	616	A
545	A	576	A	617	A
546	A	577	B	618	A
547	A	578	B	619	A
548	A	579	A	620	A
549	A	580	B	621	A

- Cont'd -

Table 5 (Cont'd)

623	A	655	A	692	A
624	A	656	B	693	A
625	A	657	A	694	B
626	A	658	A	695	B
627	A	659	C	696	A
628	A	660	A	697	A
629	A	661	A	698	A
630	A	662	A	699	A
631	A	663	A	701	A
636	A	668	A	702	A
637	A	669	A	703	C
638	A	670	A	710	C
639	A	671	A	713	A
640	A	672	C	715	A
641	C	673	C	716	A
642	A	674	B	717	A
643	A	675	A	719	A
644	A	677	A	720	C
645	A	679	A	723	B
646	A	680	A	724	A
647	A	682	A	725	A
648	A	683	A	726	A
649	B	684	A	727	A
652	B	685	A	728	A
653	A	686	C	729	A
654	A	691	A	730	C

- Cont'd -

Table 5 Cont'd)

731	A	769	A	824	A
732	A	770	A	825	A
733	A	772	A	826	A
734	A	774	A	827	A
735	A	775	A	828	A
739	B	776	A	829	A
740	A	790	A	830	A
741	A	791	A	831	A
742	A	792	C	832	A
744	A	793	A	833	A
745	A	794	A	834	A
746	A	795	A	835	A
751	A	799	A	836	A
752	C	801	C	837	C
753	A	812	C	838	A
756	A	813	A	839	A
757	A	814	C	840	A
758	A	815	C	841	A
759	A	816	A	842	A
761	A	817	A	843	A
762	A	818	C	844	A
763	A	819	C	845	A
764	A	820	A	847	B
766	A	821	A	848	A
767	A	822	A	849	A
768	A	823	A	850	A

- Cont'd -